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Selling Services

Many foundries are to-day undertaking developments in their businesses. Some have materially increased production, others are spending money in the direction of increased amenities, whilst most are paying more attention to their sales policies. Some of these efforts will be crowned with success, but not all. Success or failure will depend on correlation with the major activities of the company. Any increase in productivity must be considered in the light of maintenance of quality and the ability of the sales department to market an enhanced weight of castings at an economic level. If a foundry be convinced that its output is of a creditable character, it should be able to maintain or increase the load on the foundry without recourse to price concessions. Castings are not merely lumps of metal made to conform with the drawing or pattern supplied, but are the concrete embodiment of a service. If the castings are —according to the nature of the component— dimensionally accurate, sound, easily machineable, of high strength, of acid, heat or wear-resisting qualities, or if by their rapid delivery they prevent the shutting-down of a customer's plant, or shorten the period that it is out of commission, then these aspects should be stressed.

Every foundry owner is cognisant, when looking through the order book, of cases where low prices are being accorded, and a query will often reveal that in 1930 or thereabout, the favoured firm or firms had once "paid the wages" by handing over a sizeable cheque on a Thursday afternoon. Yet is there a general realisation that it was probably on account of cutting prices to the bone that such dire straits came about. Still we are not sufficiently inhuman to deny the right of concessions to proved friends, for they will always be a good stand-by. The selling for which the representative should receive high commendation is where he can replace with a casting a component hitherto made by a competitive process. That is a real gain to the industry. If, on the other hand, he merely deflects orders from another foundry to his own, he may, unconsciously, be starting an avalanche of price cutting, unless the acquisition is based on some consideration other than price.

At the moment the selling prices of iron castings show wide variation. This is easily understandable, as conditions vary so widely from firm to firm, the ability to produce cheaply being mainly in the hands of the smallest concerns. Here quite often the owner functions as buyer, salesman, manager, and technician. We suggest that these expert functions are worthy of reflection in the selling price, as the larger concerns would quickly qualify for Carey Street if they failed to include these costs in their overheads. Moreover, these small concerns need a higher rate of profit than their larger competitors, for the acquisition of one item of modern foundry plant probably bears a formidably high ratio to the capital of the company. The proposals of the Government to include a number of foundries in their unwanted scheme to make iron and steel industries a State monopoly, will bring about a new form of competition. This need not be feared, if the nationalised foundries play to the same rules as free enterprise. The experience already gained has shown that State monopolies do not normally produce either cheaply or economically, the reverse being usually the case.

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Second Conference on Management

As previously announced, the second Conference on Management to be organised by the Council of Ironfoundry Associations will take place at Ashorne Hill, Leamington Spa, on the evening of Thursday, May 5, and all day Friday, May 6. All member-firms are warmly invited to send representatives; depending on accommodation available, two or more from each firm will be welcomed. The Conference programme (which may be subject to slight alteration) is printed below, and an application form may be obtained from the Council at Crusader House, 14, Pall Mall, London, S.W.1. Forms should be completed and returned to the Secretary as soon as possible. By holding last year a conference on management, the ironfounding industry gave a lead to other manufacturing industries, and considerable publicity and commendation followed the C.F.A.'s enterprise as a manufacturers' association dealing with this subject.

The first conference aimed at covering general principles and giving an insight into the main aspects of management work. This year the intention is to deal more specifically with certain branches, and the programme is planned to provide the maximum amount of practical help for all those ironfounders who attend. In addition to the main speaker, who is a national authority, at each session there will be a supplementary talk by a well-known industrialist, who will give a lead to a really practical discussion. Ironfounders will see from the programme below that a certain amount of free time is allowed which can be used for informal discussion.

Protective Clothing Exhibit

In view of the increasing attention which is being shown in the ironfounding industry to factors affecting health and safety, the C.F.A. has collaborated with the Industrial Safety Museum of the Factory Department to provide a representative collection of protective clothing suitable for wear in ironfoundries. This will include safety boots, spats, goggles and other safety devices, and will be shown in a suitable area close to the conference room.

Programme

Evening, Thursday, May 5.—Introductory remarks by the Chairman (Mr. N. P. Newman). "Productivity and Profit—A Job for Management." Speakers: Mr. C. D. Hunter, A.M.I.Mech.E. (director, Stevenson, Jordan & Harrison, Limited), and Colonel W. A. Grierson (managing director, Hayeshaw, Limited, Manchester), who will talk on the application of management engineering to the cotton industry. All talks will be followed by discussions.

Morning, Friday, May 6.—"Human Factors in Industry." Speakers: Dr. C. B. Frisby, Ph.D., B.Com. (director, National Institute of Industrial Psychology), and Mr. H. Weston Howard, C.B.E. (director, Hayward-Tyler & Company, Limited, Luton), who will talk on the application of these factors in the engineering and foundry industries.

(*Concluded at the foot of column* 1.)

Afternoon.—"Ablution Centres for Ironfounders: a Round-Table Discussion." (Chairman: Mr. J. W. Gardom.) Speakers: A manufacturer (Mr. W. C. Matthewman, Brightside Foundry & Engineering Company, Limited); a foundry owner; a user (a moulder); and a supervisor.

"Selling Iron Castings." Speakers: Mr. W. H. Harper (managing director, John Harper & Company, Limited, Willenhall) and Mr. John Lake (Lake & Elliott, Limited, Braintree). The proceedings will end with a summing-up by the chairman.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

APRIL 25.
Institution of Production Engineers
North-Eastern Section:—Annual General Meeting, followed by Chairman's Address, at the Lecture Theatre, Neville Hall, Newcastle-upon-Tyne, at 6.30 p.m.

APRIL 26 to 29.
Institute of Welding
Spring Meeting at Beach Hotel, Southsea. Programme commences 10.30 a.m., April 26.

APRIL 26.
Institution of Works Managers.
London Branch:—"The Development of Welfare in a Small Factory," by W. H. Bower, at the Waldorf Hotel, Aldwych, London, W.C.2, at 6.45 p.m.

APRIL 27.
Institute of British Foundrymen.
London Branch:—Annual General Meeting, followed by films on "Non-ferrous Foundry Practice," presented by F. Hudson, at the Waldorf Hotel, Aldwych, London, W.C.2, at 7.30 p.m.
Birmingham Branch:—Annual General Meeting, followed by "Foundry Contacts," by A. T. Johnstone, at the James Watt Memorial Institute, Great Charles Street, Birmingham, 1, at 7 p.m.

APRIL 27 and 28.
Iron and Steel Institute
Annual General Meeting, on April 27, in the Lecture Theatre, Central Hall, Westminster, London, S.W.1, and on April 28 at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1. Detailed programme printed in the JOURNAL March 17, page 238.
Institute of Vitreous Enamellers.
Northern Section:—Annual General Meeting, followed by "Factors Controlling Production," by A. J. Biddulph, at the Queens Hotel, Manchester, at 7 p.m.

APRIL 28.
Leeds Association of Engineers.
Annual General Meeting, Election of Offices and Presidential Address, at the Hotel Metropole, Leeds, at 6.45 p.m.

APRIL 29.
Institution of Production Engineers.
South Wales and Monmouthshire Section:—"How the Money Moves in Business," by T. G. Rose, M.I.Mech.E., at the South Wales Institute of Engineers, Park Place, Cardiff, at 6.45 p.m.

APRIL 30.
Institute of British Foundrymen
West Riding of Yorkshire Branch:—Annual General Meeting, followed by a Paper by E. W. Fell, Dr. Ing., M.Sc., F.R.I.C., at the Technical College, Bradford, at 6.30 p.m.

DONCASTER CHAMBER OF COMMERCE have passed on to the Associated Chamber in London details of a scheme prepared by Mr. A. E. Emberton, managing director of Peglers, Limited, brassfounders, Balby, Yorks., for the payment of employees' National Insurance contributions to the Ministry in a lump sum at periodical intervals.

New Australian Foundry

Mechanised Shop for Motor-vehicle Castings

General Motors-Holdens, Limited, have built at Fishermen's Bend, Victoria, a modern mechanised grey-iron foundry for the production of castings for the first all-Australian motor-car—the Holden.

The Fishermen's Bend plant occupies an area of 50 acres, and an initial outlay of £A341,000 was necessary to establish the foundry. Pouring capacity is approximately 30 tons of metal per day, and new sand consumption is given at 15 tons. The range of products includes cylinder blocks and heads, manifolds, transmission housings, bodies and pistons for shock absorbers and a wide variety of other items.

The moulds for the larger castings are made on Milwaukee machines and are transported on a pallet conveyor; these are shown in Fig. 1. Complete mechanisation of the handling of the sand is arranged, with normal overhead feed to the moulding machines. Pouring is carried out whilst the moulding flasks are moving on a conveyor. The pouring ladles are carried to the pouring station on an overhead mono-rail from an electric holding furnace. There are suction ducts to remove dust and smoke at the pouring station and, as the mould moves from the pouring station to the vibratory shake-out, the conveyor itself is fully enclosed. This prevents fumes produced after casting from escaping into the foundry. Fig. 2 shows the general arrangement of the pouring station.

Core-shop

The core sand used is oil-bonded and is mixed and conveyed to hoppers above five core-blowing machines on which the majority of the cores are produced. Daily potential output of cores is sufficient for 90 cars. The baking is performed in a vertical conveyor-type oven. Assembly, sizing and inspection of cores is carried out on an assembly-line basis. In the case of major castings, such as cylinder blocks and heads, and transmission cases, the core is set in the mould by the use of fixtures, and its position is then checked by gauges. To facilitate handling, all the core-boxes and drying plates are made from light-alloy castings.

The type of metal used for the main production is a low nickel-chrome alloy iron. The equipment for melting consists of two cupolas, used on alternate days, and an electric furnace for superheating and refining. Uniformity is maintained by routine control tests, supported by full laboratory techniques.

Large castings are transported on hooks from an overhead mono-rail conveyor through a shot-blast chamber to the dressing and inspection departments. Smaller castings are delivered to the cleaning section by means of a chute from the mould conveyor line. In Fig. 3 is shown a fettler at work and in Fig. 4 a section of the pendulum conveyor for taking castings for shot-blasting.

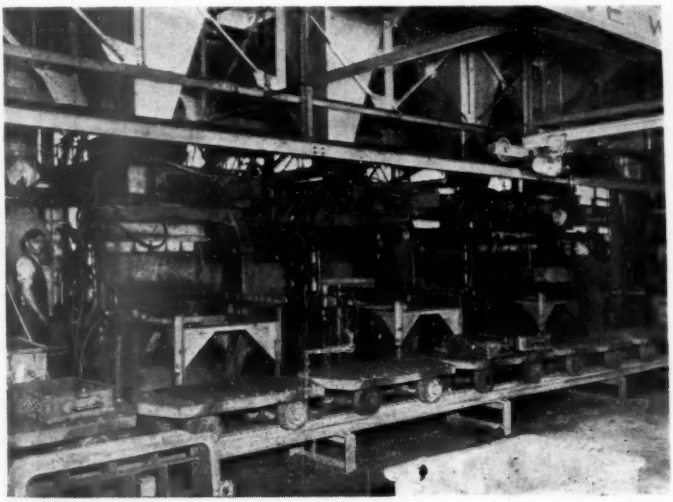

FIG. 1.—PALLET-TYPE MOULD CONVEYOR IN THE FOREGROUND WITH A BATTERY OF MILWAUKEE JOLT-SQUEEZE-STRIP MOULDING MACHINES ALONGSIDE. NOTE THE SHORT, NARROW ROLLER TRACKS FOR TAKING THE EDGES OF THE MOULDING BOXES AS THEY LEAVE THE MACHINES. SAND SUPPLY IS FROM OVERHEAD HOPPER.

New Australian Foundry

FIG. 2 (RIGHT).—POURING STATION ON THE CONVEYOR LINE: NOTE THE HOOD FOR EXHAUSTING FUMES PRODUCED DURING CASTING. LIGHT-ALLOY MOULDING BOXES ARE USED.

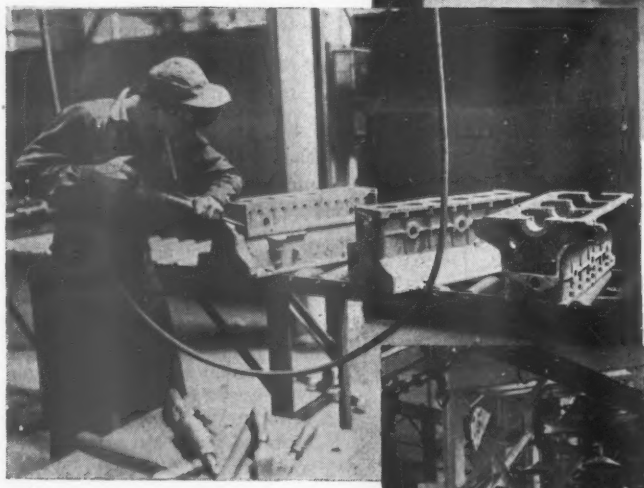

FIG. 3 (LEFT).—FETTLER USING A PNEUMATIC CHISEL FOR REMOVING FLASH FROM THE CASTING WHILE IT IS CARRIED ON A ROLLER CONVEYOR.

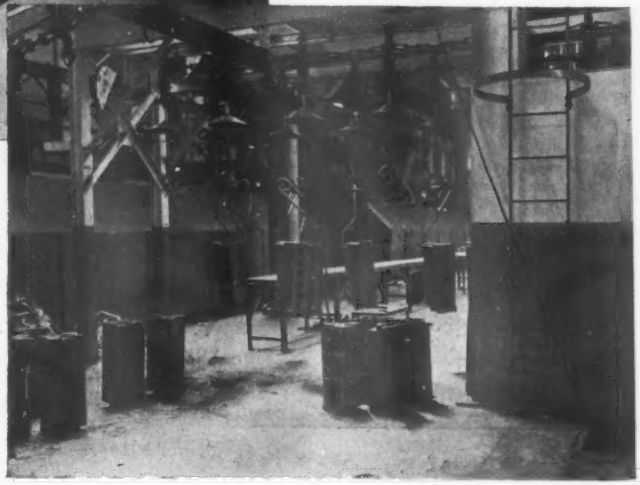

FIG. 4 (RIGHT).—PENDULUM CONVEYOR FOR CARRYING THE LARGER CASTINGS, SUCH AS CYLINDER BLOCKS, HEADS AND TRANSMISSION HOUSINGS, FROM THE SHAKEOUT THROUGH THE SHOT-BLASTING CHAMBER.

Casting Inspection*

How a Modern Need for the Maintenance of Quality in Castings is achieved

By J. Howard Williams

(*Continued from page* 349.)

Pattern Defects

This heading covers defectives due to dimensional errors on new or renovated patterns, and also defectives from damaged patterns. The latter are not always the responsibility of the pattern department, as, more often than not, the damage occurs after the pattern has left the pattern maker, but proof of this is often lacking. "Off-set" due to pattern faults can easily be recognised on single patterns, all castings being off-set approximately the same amount and in the same direction. Where several patterns for the same casting are used at one time, generally on a machine pattern-plate, it is difficult to be sure whether the off-set is due to moulding or pattern faults, as only one in six, or perhaps a dozen, may be off-set. If the inspector has the slightest suspicion that off-set is due to pattern faults, it must be reported at once; a damaged pattern will cause copious scrap in a short time.

Pattern defects, due to wear, ill-treatment, or wood distortion often develop gradually. The inspector's eye becomes accustomed to the slight fault, the worsening of the fault is so gradual that it is not noticed, until finally scrap castings are received from the machine shop, or customer. There are only two ways of preventing this type of scrap—an inspector with a very keen "eye," and a thorough check of all pattern equipment before it is issued to the foundry. If pattern equipment is in use for long periods, it should also receive an occasional checking while in the foundry. Of course, where dimensional inspection by templates, gauges, etc., is in use, many faults which are possibly due to patterns are unlikely to remain unnoticed, but it is impracticable to check all points on all castings by gauge, so the inspector's "eye" remains the chief instrument of detection, and maintenance of patterns the chief instrument of prevention.

Dimensional inspection of the first casting off a new pattern (or altered or renovated pattern) can often be carried out on fairly simple castings with a ruler or calipers, but on intricate castings marking-off is the only reliable method. Marking-off as a pattern check is much more difficult, and takes longer than normal machine-shop marking-off, as every dimension has to be checked. Machine-shop marking-out always takes many of the casting's dimensions for granted, the only check as a rule being on the portions to be machined. Dimensional inspection of a new casting is a highly-skilled job, and if possible should be done by, or under the supervision of, the casting inspector.

The Author's method of avoiding scrap due to dimensional errors on new patterns is as follows:—When a new casting is made, the foreman pattern-maker informs the inspector that a dimensional check is required, and at the same time gives him the necessary drawing. After the casting is examined, the drawing is either returned to the pattern maker, marked O.K., or with a sheet fastened to it, on which are clearly described any dimensional errors which have been discovered. After the casting has passed the dimensional and other normal foundry examinations, it is then sent for machining, and is kept under observation by the casting inspector until it has passed to its final inspection after machining, and, possibly, the hydraulic test. Any further defects of a dimensional character or such faults as porosity, etc., are than either added to the pattern report, or sent separately to those persons concerned. When all faults have been corrected, the casting is put into normal production.

Use of Acoustics and Sense of Touch

A keen, or even a "musical," ear is a great asset to a casting inspector. When, by experience, his ear is properly trained, it is possible, and even easy, to test castings for fractures, thin places and concealed gas pockets by a few taps with an inspection pick or a small hammer. An expert at this form of inspection is just as efficient on the majority of castings as the usual mechanical aids to inspection, such as crack detectors, or even X-rays. Of course, there are exceptions to every rule, and the inspector will soon find by experience what types of castings are not suitable for this method of testing.

The following is a description of a typical casting on which the acoustic test is useless for finding fractures; in such cases mechanical aids should be used, if visual detection is too difficult. The casting shown in Fig. 16 is a valve seat, made in sizes ranging from 3 in. to 8 in. in dia., other dimensions in proportion to those shown. Fractures are liable to occur in the thin ribs between the ports, but owing to the shape of the casting the fracture cannot open and vibrate, and the ear receives no clue to the presence of a crack. The numerous ribs and the thick outer ring, which are not cracked, hold the ends of the fractured rib together so tightly that there is no audible vibration.

When testing a batch of castings for fractures by the "acoustic" method, a comparison of the note given by each casting when tapped will usually be sufficient. If proof of position, and extent of the fracture is required, the well-known "chalk and paraffin" test will provide it. When the inspector is carrying out a routine examination with the aid of a "pick" on an apparently sound casting, his face will

*A Paper forming the basis of a lecture to the Wales and Monmouth Branch of the Institute of British Foundrymen, Professor Jones presiding. The Author is Castings Inspector with Holman Brothers, Limited, of Camborne, Cornwall.

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sometimes light up with that nasty smile peculiar to inspectors; he has struck a place, which to the trained ear, sounds thin. If this can be verified by calipers, and the casting is too thin to use, the casting is scrapped, the fault is reported to the foundry, someone mutters "thr,wing away real good castings," and the inspector starts looking for trouble on the next casting. Sometimes, however, the section which sounds thin cannot be measured by any orthodox method; in such cases the sense of touch can often be used to assess the thickness quite accurately. The same method used instead of calipers is quite reliable on numerous types of castings, and it saves considerable inspection time; here is a description of how the sense of touch can be used. Place the tip of the finger, or fingers, on one side of the section being tested, then tap the opposite side lightly with the pick, or similar tool. After some experience the movement, or vibration of the section, will inform the inspector with reasonable accuracy the thickness of the casting at that point. The Author can measure thicknesses from $\frac{1}{16}$ to $\frac{3}{16}$ in. by this method within $\frac{1}{32}$ limit, from $\frac{3}{16}$ to $\frac{1}{4}$ in. the margin of error is progressively greater, and above $\frac{1}{4}$ in. in most cases the method is useless. There is nothing wonderful in being able to do this; almost anyone should be able to do it, after a little practice.

Influence of Design on Percentage of Defectives

Although it is impossible to compile exact figures to prove it, a proportion of defective castings from all foundries is due to bad design. By designing with a knowledge of foundry requirements, it is possible to prevent several different forms of defects on castings. The majority of castings are reasonably well designed from a foundry viewpoint, but a small proportion which are not are a continual cause of scrap in the foundry. The moulder is usually blamed, although it is often difficult for him to combat the effect of bad design.

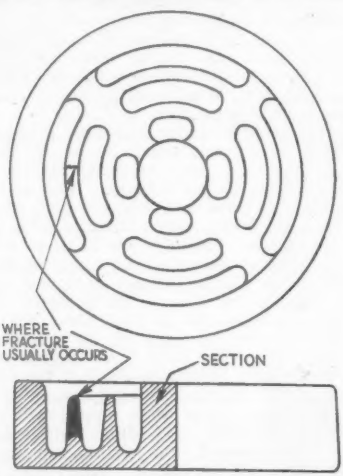

FIG. 16.—VALVE-SEAT CASTING ON WHICH ACOUSTIC TESTS SHOW NEGATIVE RESULTS.

Castings of bad foundry design can often be produced by a first-class moulder, with a negligible percentage of scrap, when all other relevant conditions are favourable; but unfortunately first-class moulders are not plentiful, and other conditions are not always right. In cases where simplification of foundry problems involves any considerable addition to machining costs, a compromise is usually the solution. This satisfies neither machine shop nor foundry, as a rule, but is obviously the best way in the interest of economy. Whether or not the pattern is foolproof is mainly dependent on the patternmaking technique; but a badly-designed casting will make the production of a good pattern very difficult, or perhaps impossible.

The well-known error of designing sudden and considerable variations in sectional thickness *is* less common than it used to be; probably because it is well known. The ideal casting should consist largely of straight lines, with generous radii at the junction of angles, and should avoid projecting bosses, flanges, ribs, etc., wherever possible. Although this latter proviso is also well known (or should be), an examination of castings produced by an average foundry does not give that impression. In justice to the majority of the recently-designed castings, it must be stated that the majority of badly-designed castings have been made several years previous. The result is similar to living with peculiar people, if one lives with them long enough one does not notice their peculiarities.

To sum up, here is an opinion on designing problems in general:—The machine shop wants perfect, precision castings, with the minimum of machining, and all operations foolproof and easy; the foundry would like all castings of simple design from every foundry viewpoint, with generous machining allowances, and plenty of latitude to cover usual foundry troubles: the designer would sometimes like a casting which could neither be moulded nor machined: the salesman wants a finished article which is 100 per cent. efficient, superb in appearance, and which will sell at a competitive price. The only possible solution to the numerous problems connected with design is compromise and co-operation between all the parties concerned. This can be done by making full use of the works' production conference, at which *every* point of view is represented; it *can't* be done by the old method of everyone standing on his dignity, fighting "tooth and nail" for his prestige, and what he himself thinks is right.

Training of Apprentices

Every youth entering any of the various branches of engineering should have a period of training in the foundry, spending the last few weeks of his training period in the foundry inspection department. If he intends working in the drawing office as a designer, he will soon learn that a designer with only a vague

theoretical knowledge of foundry problems is quite often the cause of them. If he is to become a pattern-maker, a knowledge of faults liable to occur on a new pattern (usually dimensional) or troubles on older patterns due to ill-treament, wear, damp, heat, etc., is invaluable. He will also learn that the patternmaker who can plan a pattern to produce castings in an easy, economic and foolproof way is a clever man and of great value to the firm, and to the foundry is particular. He should note that the only infallible test of "foolproofness" of a pattern jig or gauge is to let an incompetent person use it; a reasonably clever tradesman will often be unable to find an incorrect way of using it, but someone "dead from the neck up" will find a way with no apparent effort, and in a short time.

If the youth intends to become a moulder or coremaker, a fore-knowledge of the mistakes he is likely to make in the future, together with some idea of how to avoid them, is certainly worth the devotion of a few weeks of his apprenticeship. Those learning fitting and turning will also benefit in many ways from experience in the casting inspection department. As machine shop and foundry personnel speak different technical languages, a knowledge of both is a help towards better understanding between foundry and machine shop; often the inability to understand the other's problems is the cause of much unnecessary friction between them.

Machinists with Foundry Training

Castings being machined by a man who understands them have the best chance of success, as often, where minor casting faults, such as a slight core-shift, are present, the knowledge gained in foundry inspection will make all the difference between scrap and a useful casting. Castings having slight gas-holes, slag or dirt in the top surface can often be salvaged during machining by a man with some foundry experience; unfortunately, possession of this knowledge is not common.

Prior to the introduction of modern methods of supervision, a number of good castings have been scrapped, simply because the machine-shop operator did not know top from bottom. One notable instance was a batch of iron bushings cast in the vertical position, the top inch of which was used both as a riser and chucking piece; naturally, that inch, *by intention,* contained all the gas-holes, dirt, shrinkage, and so on, which were present in the castings. A considerable percentage of the batch were scrapped through the use of the wrong end of the casting. Of course, use of a machining operation-sheet, as at present, *could* have prevented, and supervision *should* have prevented, this happening, but a little knowledge of foundry practice on the machinist's part would most certainly have done so.

A collection of portions of castings, risers, *etc.*, usually as small as possible, sectioned to show interesting and instructive casting faults and conditions, and with explanatory notes attached, is helpful in the training of short-term apprentices, and quite a comprehensive selection can be garnered by the foundry inspector in a year or two. If this training is given to boys under 18 to 20 years of age, it is usually wasted; they have not had sufficient experience of engineering to absorb the full benefit.

Do's and Dont's for Inspectors

Inspectors should never sneer or laugh in a nasty way when they inform persons of scrap due to their mistakes; inevitably there comes the time when the inspector makes a silly mistake. They should not become over-confident in their ability to spot wasters; "pride goeth before a fall," and the unrestrained pleasure which an inspector's "fall" gives to the majority of the foundrymen is greater in proportion to his "cocksureness" previously. An inspector should never harbour a grudge, or think he is ill-treated, when the management metaphorically "rubs his nose" in some scrap castings he has passed; it is the most effective form of education an inspector can have and an infallible cure for "swelled head." If the reason for the scrap is obvious and the financial loss regarding machining is heavy, the inspector will feel so small that a mouse-hole looks like a railway tunnel to him, but the ultimate results are good—the inspector will be unlikely to make the same mistake again, or even a similar one, so, therefore, he is a better inspector than he was before he made the mistake. "Tell a man he has made a mistake, which has resulted in scrap, and he dislikes you; tell him how to do the job correctly and so avoid more scrap, and he positively hates you." This is a common trait of human nature, and the inspector is just as liable to suffer from it as anyone else, so he should never be surprised or upset at instances of ingratitude when he has been genuinely trying to be helpful.

A man under the control of the foundry foreman, should not imagine he is an inspector, he is merely a "yes-man" to a biased person. If inspection is to be done properly, the inspector should be answerable to the management only.

The casting inspector's task is to raise the standard of quality of foundry production, and a good inspector will certainly do so; but if he expects the foundry staff to admit that any credit is due to him for improvement or show any gratitude for his services, he will often be sadly disillusioned. The inspector who passes a minor instance of bad fettling to-day will certainly be expected to pass a major one to-morrow. It is truly remarkable how much difference a "biased eye" makes on a rule measurement. "Differential" calculus for inspectors may be expressed as three foundry sixteenths equal one inch.

An inspector who lacks a sense of humour will find troubles—which are inherent to inspection—are a very heavy load at times. An inspector with a keen sense of humour must never use it in his work, at other people's expense; but the ability to view his own difficulties and troubles in a humorous light cannot be valued too highly. He should not trouble his mind about *what* a man says, but try to reason *why* he said it; this thought process, used habitually, gives surprisingly good results and, incidentally, a discussion with someone who also thinks along the same lines can be as interesting as a game of chess. A high standard of quality

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can be *kept up* by a good inspector, but it must be *set* by the management; an inspector is only as good as the management want him to be.

Summary

This article on casting inspection is the result of personal experience, and the opinions and information given in it are mainly the Author's own. The views, opinions, *etc.*, expressed are probably not in *every* instance, identical with those of the firm for which he works, but they give a fairly clear idea of the standard of inspection which is encouraged by them. The Author also wishes to express his thanks to the firm for their help and encouragement during the time he has held the post of casting inspector; any aids to inspection which the Author thought would improve his results were supplied, without exception, and in many cases were suggested by the management without the need of asking. Largely as a result of the firm's policy of encouraging a high standard of inspection, the Author became sufficiently interested in the job to make a record of the results of his experience, which may be of interest to others connected with foundry work. If this article arouses interest, arguments or comments—favourable or otherwise—the Author will know he has not wasted his time, and he will probably improve his knowledge of casting inspection in proportion to the amount of constructive criticism he receives.

In the Author's opinion, there are only two kinds of casting inspection, and although there may be some variations in minor matters, the basic principles are either one or the other. The first is the inspector who is a kind of glorified fettler's critic, and is expected to show any faulty castings to the foundry foreman, or similar authority, who then decides on salvage or otherwise in borderline cases. He is not encouraged to interest himself in foundry problems; he has little power, less prestige and, having little personal responsibility, he loses interest and develops into a clock-watcher. The second is the inspector who is encouraged to take an interest in all foundry matters relating to inspection, is allowed to stand on "his own two feet," to fight his own battles, whether they are with the foundry staff, machine shop, customer, visiting inspectors or anyone else, and is given the impression that he is fully and finally responsible for all castings he examines, although the manager may at times "smile behind his hand" when he "straightens up" the inspector's ideas if he throws his weight around too much, or gets mistaken ideas into his head. It is fairly obvious which type of inspection is likely to benefit a foundry most, but there are many details regarding inspection methods and general principles mentioned in this Paper which are, to say the least, debatable, so foundrymen and fellow-inspectors, come along!

"DOMESTIC HEATING, OLD AND NEW," is the title of the lecture to be given on April 27 by J. S. Hales, B.Sc., to the North Western Fuel Luncheon Club.

Publications Received

"Mitia" Carbide Tips and Tools Instruction Book. Published by Firth Brown Tools, Limited, Bessemer Building, Carlisle Street, Sheffield, 1.

The reviewer was fascinated by a double spread, dart-board sort of illustration (Fig. 35) which gives the likely causes of tool failure in unique fashion and easily understandable language. The book, which runs to over a hundred pages, is coil wire bound, and is excellently illustrated—mainly in orange and blue to differentiate between the tip and the shank. The information assembled has been well chosen, and the data given would be difficult to find in such handy form elsewhere. As "Mitia" represents a range, the publication of such data is highly desirable in order that intelligent selection and use can be ensured. Foundries possessing their own machine shops will find this manual extremely useful and they are counselled to write to the Sales Promotion Department of the publishers for the favour of a copy.

Quelques Consultations de nos Ingénieurs-Spécialistes. Published by the *Centre Technique des Industries de la Fonderie*, 46 Avenue Victor Hugo, Paris (XVIe).

From the 10.000 queries, major and minor, which have been dealt with since the creation of the "Centre" in 1942, a selection covering eight reports have been reprinted in this pamphlet. The field dealt with is typical of any national foundry industry. The first one covers the production of a 30 per cent. lead, copper-lead alloy; and the dangers to be associated with its production are rightly stressed. Next is a report on surface defects in aluminium castings followed by one on chrome and nickel additions to cast iron. Then comes a report on the rapid annealing of malleable covering quite a wide range of possibilities. In dealing with the monolithic lining, a specification is given for the refractory both in respect of chemical composition and grain size. Maxima of basic impurities allowable are given as MgO 0.20; CaO 0.80; alkalis 0.50 and iron oxide 1.0 per cent. The preparation of the material is set out in much detail even to the use of flat and peg rammers in the actual application. For the repair of monolithic linings, it is suggested that a mixture consisting of four parts of the original material, one part of high-grade refractory clay and one part by volume of powdered coke be used.

The next report is a proposed layout for a foundry to produce 75 tons per month of iron castings. This study is certainly very commendable and not the least extravagant in its claims. The booklet concludes with reports on defects in nickel plating; the testing of a space-heating stove and of a cooking oven. The reports have been well chosen and this effort is worth emulation by other research associations. As all the reports are reproductions of type-written letters, it gives an impression of attractive intimacy, which is not the case with "collected researches."

The Engineering Properties of Meehanite*

High-duty Castings from the User's Viewpoint

By A. Campion, Hon.M.I.B.F.

(*Continued from page* 338.)

Fundamental considerations, based upon a study of the atomic structure, indicate that cast iron and steel present an ordered crystalline form in which slip can occur along certain cleavage planes, which permits plastic deformation. In brittle materials, the atoms have no ordered form of dispersion, there are no cleavage planes along which slip can occur, so fracture occurs without plastic deformation.

Impact Tests

Common grey cast iron may appear to break easily, because it contains a high content of graphite in the form of large and continuous flakes, which cause it to have a low resistance to shock.

In Meehanite high-duty metal, the graphite, being controlled in quantity and size, and dispersed in random fashion, permits of plastic deformation and confers a high degree of toughness upon the material. Unfortunately, no test has yet been devised which provides a satisfactory measure of toughness. In the case of steel, the Izod or Charpy single-blow impact test has usually sufficed to indicate whether the material had a tendency to brittleness, but such tests are of small value when applied to cast iron.

Recently a British Standard impact test has been adopted for cast iron, in which a modified Izod test on an unnotched test-piece, machined to 0.798-in. dia., is used, in the standard 120 ft.-lb. machine fitted with a special vice. This test is purely empirical, but does appear to show comparative results between materials of the cast-iron type. The Stanton repeated-blow impact test, which perhaps represents impact fatigue rather than pure impact, may be considered as a guide to toughness, or absence of brittleness. Results obtained by these tests on the various engineering types of Meehanite are shown in Table III.

Compression Test

The compression test probably shows even more clearly the freedom from brittleness of the material, particularly in the highest strength types. The strength in compression of the general engineering types ranges from 60 to 100 tons per sq. in. Ordinary cast iron containing high percentages of graphite in large flakes may show "graphite brittleness" and have a low resistance to shock. In Meehanite, however, the control of the form and quality of graphite results in an increase of toughness. Fig. 8 shows the results of a series of tests made on several materials under compressive loading, using test-pieces 4 in. long and 0.798-in. dia. The load above each bar represents the point at which the material buckled. The type GA, which contained 7 per cent. graphite by volume, behaved like steel and malleable iron. The ordinary cast iron, which contained more than 10 per cent. of coarse graphite by volume, collapsed with a brittle fracture.

The full appreciation of high-duty cast iron has, in some cases, been delayed on account of a somewhat mistaken view of the value of ductility in engineering. It is important to differentiate between the generally recognised physical properties and those actually required to meet service demands. The main interest in engineering is that the material shall be able to resist, without deformation or fracture, the stresses to which it will be submitted in service. The elongation value is not by itself a criterion, in design, of serviceable material; it is only incidental to the essential property, *i.e.*, the effective strength to the limit of elastic deformation. An interesting example of non-ductile material standing up to severe service conditions, where high tensile strength, fatigue and torsional properties in com-

Original test bar.	Meehanite "GA."	Tool steel.	Cast steel.	Malleable iron.	Grey cast iron.
Load, tons per sq. in.	55.7	56.0	35.2	29.8	27.6

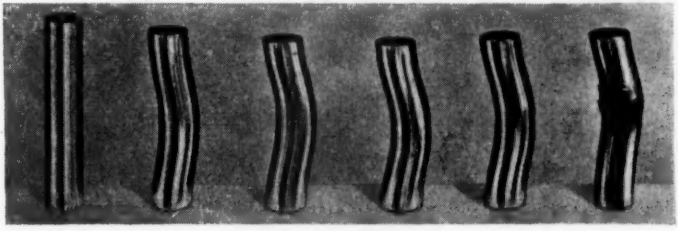


FIG. 8.—TEST PIECES OF VARIOUS MATERIALS SUBJECTED TO INCREASING COMPRESSION STRESS TO YIELD POINT: BARS 4 IN. HIGH AND 0.80 IN. DIA.

* An abstract from a lecture given at the Engineering Centre, Glasgow, Sir John Duncanson presiding.

The Engineering Properties of Meehanite

bination with density and solidity are necessary, is found in the cast crankshafts for Diesel engines. Here, all previously-held ideas are negatived, and a casting, in a metal giving practically no elongation, proves not only satisfactory for the application, but in some ways is superior to a forged steel crankshaft. For instance, a forged crankshaft is restricted to a form or shape which can be conveniently hammered out, a cast crankshaft presents possibilities in moulding which permit a greater design strength, by the adoption of hollow shafts and shaped webs.

Non-warping

Another important property of Meehanite is its freedom from distortion or warping after casting, and subsequent machining. The stability of a casting is not easily measured by any one simple test, but it means that no movement of the finished component or member is permissible during actual service.

It has to be remembered that most metals shrink during solidification and cooling in the mould, so that the castings leave the mould with residual stresses. It was with the object of releasing these internal stresses that the manufacturers of precision machine tools, gauges, etc., rough machined the castings and then exposed them to the weather to "age" for periods varying from six months to two years. It has, however, been demonstrated that such treatment was ineffective, as not more than 10 per cent. of the stresses were released, even after the maximum time of exposure. Modern methods of achieving the release of internal stresses consist of heating the castings to a temperature between 500 deg. C. and 600 deg. C. for five or six hours in the case of heavy parts, such as lathe beds, turbine castings, Diesel engine parts, etc., with lesser times for small or thin parts like gauges. This treatment releases 80 to 90 per cent. of the original internal stress.

Owing to the structural constitution of Meehanite it responds more readily to "stress relief" treatment than does ordinary cast iron. The results of some investigations carried out at the National Physical Laboratory establish the fact that Meehanite in the "as cast" condition moved less than 4×10^{-4} in. over an observation period of 28 months, whilst the same type of Meehanite Metal after being stress relieved, by heating at a temperature between 450 deg. C. and 500 deg. C., showed a movement of less than 2×10^{-5} per foot during a period of 20 months' measurement.

TABLE III.—*Izod and Stanton Impact Tests on Various Meehanite.*

	Meehanite grade.					
	GM	GA	GB	GC	GD	GE
Izod value in ft.-lb.*	—	25–35	15–23	12–20	9–15	6–12
Stanton test: Approx. No. of blows ..	14,000	12,500	9,000	3,500	600	200

* Un-notched test piece 0.798 in. diam.

This high degree of stability, coupled with high damping capacity, and the property of crackless plasticity—the property which prevents the building up of resonance stresses to critical proportions—permits the material to be used successfully in many applications for which steel castings or forgings have normally been employed.

Fig. 9 shows an interesting example of Meehanite castings being used to replace steel, and at the same time allowing a reduction in section of metal, and consequently a saving in weight. The hydraulic steering gear shown is now made with all cast parts in GC type, with a 25 per cent. reduction in weight, and at the same time with perfect pressure tightness.

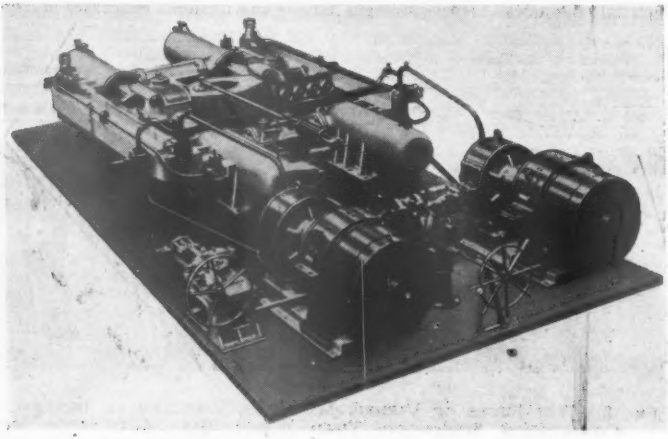


FIG. 9.—RAPSON SLIDE HYDRAULIC STEERING GEAR.

Castings are frequently required in positions where they are submitted to temperatures higher than the normal, and yet must retain strength and form. It is well known that when the internal combustion engine was introduced considerable trouble was experienced owing to failure of iron castings by cracking, growth, scaling and change of shape of the parts that became heated.

The investigations of the metallurgist, in co-operation with the experience of the engineer, together with improved foundry technique, have shown how to overcome the difficulties. It is now possible to provide iron castings which can retain strength properties and dimensions under

more severe heat influences. The general engineering types of Meehanite retain strength characteristics to a very large degree up to 400 deg. C., thus definitely covering an important service temperature range, as in superheated-steam installations, Diesel engine cylinders, pistons, liners, and other parts. The results of tests at temperatures ranging from 15 deg. to 600 deg. C. for determination of ultimate tensile strength, proportional limit stress and modulus of elasticity, are shown in Table IV.

Creep Test

The operating temperatures of many machines and structures tends to increase, so the significance of basic engineering testing at normal temperature tends to decrease in importance. The short-time test at elevated temperature also loses much of its value as a guide to the designer, so far as the selection of material is concerned for the construction of machines, etc., which will operate on a long-term basis under comparatively small loads without excessive deformation.

The "creep" properties have therefore been extensively investigated in order that the engineering designer may obtain specific information about the behaviour of materials at various temperatures under defined stress conditions.

The desired sensitivity of creep tests or the order of magnitude of the creep data depends upon the service application. In some cases up to 425 deg. C., the service may require maintenance of dimensional stability where data on stress-strain relationships involving very low strain rates are essential. At higher temperatures larger strain rates may be permissible. In some instances it is required to know the stress-temperature characteristics over some given period during which freedom from failure by fracture can be guaranteed.

TABLE IV.— *Physical Properties of Meehanite at Elevated Temperatures.*

	Temperature, deg. C.	Proportional limit stress, tons per sq. in.	Ultimate stress, tons per sq. in.	Young's modulus of elasticity, lb. per sq. in. × 10⁶
Meehanite Type GA	15	9.8	24.1	20.2
	225	10.8	25.8	18.8
	250	10.9	25.5	18.5
	300	10.75	25.0	17.5
	350	10.0	24.1	16.2
	400	8.5	22.3	14.9
	490	3.1	15.2	11.3
Meehanite Type GB	15	6.0	21.6	16.98
	225	8.1	23.7	17.2
	250	7.9	25.2	16.3
	350	7.1	21.4	15.1
	400	5.6	20.1	13.5
	450	3.7	16.1	11.3
	500	2.3	12.0	9.0

In Fig. 10 typical creep-rate curves for the GA type show this material meets the specification of creep not exceeding 10^{-6} inches per inch per hour under the following condition:—

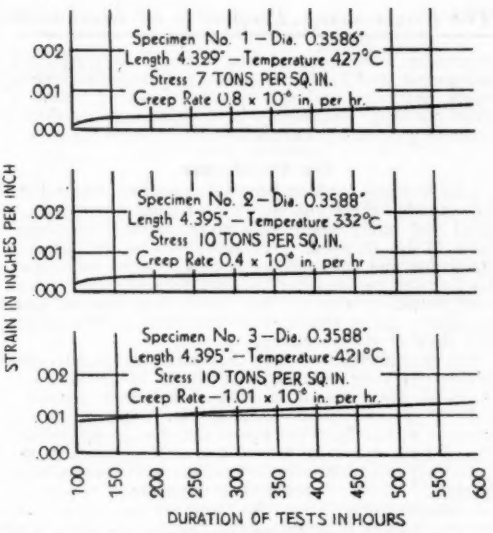


FIG. 10.—CREEP TEST RESULTS FOR MEEHANITE TYPE "G.A."

Stress 10 tons per sq. in. at 332 deg. C.
Stress 10 tons per sq. in. at 421 deg. C.
Stress 7 tons per sq. in. at 427 deg. C.

Meehanite, on account of its ability to maintain strength characteristics, and dimensional form at elevated temperatures, is largely used in internal combustion engine construction, particularly for such parts as cylinder heads, pistons, liners and fuel valves.

Wear Resistance

The material is successfully employed in many wear-resisting applications. Wear, however, is essentially a surface phenomenon, and involves many properties, such as hardness, fatigue, impact, friction, corrosion, structure and lubrication, some of which are not thoroughly understood. Each wear problem must be separately considered on its merits and according to the conditions of service before a selection can be made for any application. There are eight types of wear-resisting materials, each designed to meet a specific type of service.

Wear resistance is difficult to measure, as there is no single test which can be used to measure the resistance of the material to all kinds of wearing conditions. The comparative resistance of a number of materials to abrasive wear can be determined by estimating the loss of weight of small cylindrical pieces, after submission to the action of a shot blast in a revolving chamber for a definite time.

Successful wear-resisting applications are ball-mill liners, cement and stone crushers, rollers and mining

The Engineering Properties of Meehanite

machinery. The material has, in many cases, replaced manganese steel for beater plates, pulverising hammers, liners, segments, and ash ejectors. Fig. 11 shows a swarf-crushing machine in which wear-resisting Meehanite parts are included.

Die Manufacture

Cast iron has for long been favoured for casting dies, but usually where the number of pieces required is small and rarely where very large numbers of pieces have to be stamped. In recent years, the use of Meehanite and advances in modern foundry technique has enabled the designer to work to a file finish on a considerable number of dies. Such dies are cast true to pattern and so smooth that they can be put to work with little or no machining.

The manufacture of such dies calls for skilful and careful moulding practice, particularly in the case of dies that are required to have three exact surfaces, such as a male punch-forming die. Considerable economy results from the use of cast dies, as the initial cost of tooling can be halved and subsequent costs in buffing are insignificant in comparison with those where the use of inserts is necessary to put a die in condition for stamping operations. As there are no joints in a cast die, honing is unnecessary. The die and shoe can be designed in one piece and legs can be cast on the shoe, replacing the parallels that otherwise are required. The wearing properties of the material are exceptional, the hardness in the cast state being from 200 to 280 Brinell. The metal works up to a very fine polish after the first few hundred stampings and does not gall, scratch or load to the same extent as tool steel when made into dies of similar design. Although the machining of the metal is quite easy, it will not flow under pressure or flatten out in the manner of some steel dies.

FIG. 11.—SWARF CRUSHING MACHINE INCORPORATING MEEHANITE WEAR-RESISTING PARTS.

Meehanite can be flame hardened and dies may, if necessary, be surface hardened or may be hardened by quenching and tempering.

TABLE V.—*Basic Surface and Bending Stress Factors for Spur and Helical Gears (D.B.S. System).*

Type of material.*	Minimum tensile strength, tons per sq. in.	Minimum Brinell hardness number.	Surface stress factor (Sc.).	Bending stress factor (Sb.), lb. per sq. in.
Malleable castings ..	20	140	850	11,000
Cast iron	12	165	1,000	5,800
Cast iron	16	210	1,350	7,600
Cast iron (alloyed) ..	22	220	1,450	10,400
Phosphor bronze (sand cast)	12	60	700	7,000
Phosphor bronze (centrifugally cast) ..	17	90	1,000	10,000
Cast steel (carbon 0.35/0.45 per cent	35	125	1,400	19,000
Meehanite "GC" ..	18.5	190	1,400	14,000
Meehanite "GA" ..	23	210	1,450	14,500
Meehanite "GM" ..	27	230	1,600	14,000
Meehanite "GM" .. (heat treated) ..	28†	500	2,400	16,000
Meehanite "GM" (heat treated) ..	28†	425	2,400	17,500

* Refer., B.S.S. 436/1940. † Tensile as cast.

Gear Material

Another important application wherein the material has been successfully employed is in gearing. Cast iron still accounts for a very large proportion of gears, which may be partly due to ease of production and relatively low cost; but cast iron possesses certain definite inherent properties, which, if fully developed, would make it ideal for this application.

Metallurgical research into the properties of cast iron has resulted in a much clearer knowledge of the factors involved in the production of a perfect gear material. It was early realised by the Meehanite Research Institute that chemical composition alone was no guide to the performance of a gear, but the important factor, perhaps the all-important factor, was the structural make-up of the material. The principal properties of a cast-iron type of material of direct major importance to designers of gears are: High strength in tension and compression; wear resistance; low coefficient of friction; freedom from distortion; high damping capacity and good machinability. Whilst all these can be met, yet there is no single property that is the criterion for the assessment of the behaviour of gear material. The facts as a whole indicate that Meehanite may be considered as dependable material upon which gear designs may confidently be based. A considerable research has been carried out during recent years by David Brown & Sons (Huddersfield), Limited, to determine the surface and bending stress factors of Meehanite gears. Table V shows the characteristics of Meehanite gears in comparison with ordinary cast iron, bronze and cast steel.

Consistency

Casting reliability is measured not by the highest property value the foundry can supply in one particular type of casting, but by the consistency with

(*Concluded on page* 375.)

Institute of British Foundrymen

Venting of Cores and Moulds

Lancashire Branch Discussion

A well-attended meeting of the Lancashire Branch of the Institute of British Foundrymen was held in the Engineers' Club, Manchester, on January 12, 1949, Mr. Harold Haynes, President, being in the Chair.

MR. D. KILLINGWORTH, chief metallurgist for the foundry of Ruston & Hornsby, Limited (Lincoln), presented his Paper entitled: "The Venting of Cores and Moulds." This Paper has been printed in our issue of April 22, 1948.

Vote of Thanks

MR. S. W. SPENCELEY (Rochdale) in proposing a vote of thanks said many moulders failed to realise the importance of providing adequate vents. A typical instance had recently occurred in his own foundry. They were preparing a bedplate, hexagon form, 2 ft. across the flats and 2 in. deep. Though it was a straight core, yet it was known from past experience that such a core could give trouble through not having adequate vents.

After MR. J. KIRKHAM (Denton) had seconded, MR. KILLINGWORTH replied, and said that although it was sometimes difficult to instil new ideas into the minds of veterans, yet nevertheless it was surprising to find how much the old moulders did know even though they could not always give a clear explanation of why they adopted a certain course. One point which might be mentioned was that the old moulder attached considerable importance to the way he rammed a mould. He would ram a sand with a standard permeability of 50 in all sorts of ways, so that it had a permeability from perhaps as low as 10 to as high as 100 according to the way it was rammed.

DISCUSSION

MR. R. E. WALLWORK, Junr. (Salford), asked what was the size and weight of the castings for obtaining the results shown in Fig. 3.

MR. KILLINGWORTH explained that the casting used was roughly a four-inch cube. In addition to the four-inch block there would be about another two to three inches of metal head in the mould and a runner bush above that.

MR. R. YEOMANS (Manchester), asked if Mr. Killingworth would say that the subject he had chosen for his lecture was an argument in favour of casting jobs with closed risers. There was support for the view that it was better to leave them open. As a young man he had been assisted in the making of 30-ton jobs, which had heavy flanges, running along the top about 3 ft. down. This left a considerable shoulder of sand. That was in the days of law and order, when everyone did as they were told. They were always instructed by the chargehand, and they put a layer of ashes beneath the shoulder. The castings were satisfactory. Then he worked with a different crew on a similar sort of job, but here the chargehand insisted they should not put any ashes on. They sprigged the face, and again the castings were satisfactory.

With fine jacket cores, possibly for ¼-in. thick castings, it was quite easy to get the bits of blobs to which Mr. Killingworth had referred. In one foundry they used to run the job one way one time and another time with a top runner. According to the illustrations on the screen in each case the jobs shown were bottom poured and were only small castings. Would there be any effect on the gas pressures in the part of the mould that was not filled with metal if the mould was run from the top?

He did not know whether Mr. Killingworth was familiar with the Paper by Mr. Phillips and Mr. Grundy about the year 1930, upon the effect of gas pressure through sands which had been evenly rammed into a container which was heated up as nearly as possible to the temperature of the mould. The container was put into some kind of vessel and then heated. At that time this was regarded as being a considerable step forward in ascertaining gas-evolution properties and venting properties.

Effect of Coke Size

Mr. Killingworth's A.F.S. test piece reminded him of an air-cooled cylinder where there was a little cod of sand left in the pattern. There was a lot of trouble with the job. On the machine, in the early experiments, a sprig or two were stuck in to hold the cod of sand. Later, instead of putting the sprigs in, they dropped in a little perforated tube which rammed down into the cod with the jolting action. This cured the trouble. With regard to Table VI, Mr. Killingworth had stated the gas pressures when using coke in the ordinary way, and also the gas pressures when it was split up into small sizes. Was it not considered that the coke could be reduced to a size which was too small, so that the object for which it had been put in was vitiated.

MR. KILLINGWORTH said that Table VI dealt with actual permeabilities, not gas pressures. It showed that permeability was reduced by using a solid piece of coke with sand all round it. It must be broken into pieces. Obviously, the presence of dust in between the pieces would reduce the venting property. As Mr. Yeomans had remarked, the coke could be broken too small. He regretted that he had not seen the paper prepared by Mr. Phillips and Mr. Grundy. Their method appeared to be an approximation to moulding conditions, whereas heating in a furnace was not the same thing, the transfer of heat not being as great as when there was contact with molten metal. A dilatometer costs about £1,000, whereas his own little mould cost about 2d. All the pouring was done in the same way. He did think about top pouring instead of bottom pouring, but unfortunately never got as far as actually trying it. The only difference

Venting of Cores and Moulds

he could imagine was that with top pouring there would be a constant rate of metal entering the mould all the time, while with bottom pouring there would be a gradual slowing down of the rate of entry as the mould filled.

Application to Jacket Cores

The improved results with jacket cores were partly due to the alteration of materials. For thin jacket cores a sand of fairly uniform grain size was used with as low a core-bond content as possible, so that the actual gas given off was kept at a minimum. It would be appreciated that the reason for using a sand of uniform grain size was that with many complicated jacket cores, where they were not suitable for blowing, many pieces were bedded in the core box. Only clever operatives could bed them down, and consistently get the core to the correct hardness. A core sand that was uniform in grain size could not be overrammed to a high degree, but a sand with a mixed grain size core could be produced which was not merely harder but also very much lower in permeability.

He agreed with Mr. Yeomans, up to a point, that it would appear to be better to pour through a closed mould. A pressure would be developing inside the mould which might not be much, though in some cases it was, but it did help in forcing the gas out through the sand. The difficulty was, that if the pressure did rise fairly high, then, in the last stages of running, (particularly where there was little difference in height between the runner bush and the top of the casting, and thus only a low metal pressure), the rate of running might be so low as to produce a cold lap or a misrun on some part of the top surface. Perhaps in that case an open riser would help; otherwise, in his opinion, it did appear to be an advantage to use a closed mould.

MR. F. A. HARPER (Rochdale) said there seemed to be an anomaly in respect to Table IV with the "indicated" and "calculated" pressures as measured by water gauge. It was stated that there was an 8 in. pressure indicated for the sand mix with coal dust, but the calculated pressure was 9 in. Later on, it was stated that with the pitch sand the indicated pressure was 11 in., but that it was calculated at 7½ in. He could not understand why, if it was already indicated at 11 in., how it could be calculated at 7½ in.

MR. KILLINGWORTH explained that the calculated pressures were actually obtained from the rate of gas evolution. If the rate of gas evolution was known, and also the resistance of the pathway out, then the pressure developed could be calculated to show how it compared with that actually measured. It did compare fairly well with the coal dust addition, but the result was not quite so good with the pitch. One reason was that the rates of gas evolution for both the coal dust and the pitch were getting near the limit for the test conditions, and they were tending to blow rather than to give a proper indication on the flow meter. So there was possibly some source of error there.

MR. F. A. HARPER assumed that the 10 per cent. of coal dust was put in deliberately to create that condition.

MR. KILLINGWORTH agreed and said it was 10 per cent. in addition to what was already present, so that the total was abnormally high.

MR. F. A. HARPER said that unless this were clearly understood it would show coal dust in rather a bad light.

Necessity for Fluid Metal

DR. FLEMING (Bury) had for a long time been in agreement with some of the points mentioned by the lecturer. He had had quite a good deal to say publicly, and sometimes privately, to his colleagues with respect to the irresponsible way in which the gas content was dealt with, and gas evolution, and speeds, too. When they achieved wonderful permeability figures many people misled themselves about matters of increased gas content and increased gas evolution. There were certain types of castings which all foundries sometimes had to make, where, due partly to a very thin metal section overlying the core, and partly also to the inability to create an artificial metal head of sufficient height owing to the way the job was moulded, it was impossible to overcome the gas pressure created by the metal head. The question of soundness then became one entirely of how quickly the metal would freeze. He had in mind certain jobs where, by altering the permeability of the core (with due attention being paid to the gas content of the same sand and taking it to the utmost extreme with laboratory specimen sands), they still failed to produce good castings. There was a condition where a bubble would form on the surface of the core and it would rise.

MR. KILLINGWORTH said there were undoubtedly many castings in which there was definitely a blow through the metal, and it appeared to be beyond practical endeavour to stop it. The only method appeared to be to have sufficient fluidity, as a result of high metal temperature, so that the gas got away before the metal solidified. There were many times when there was a casting, which, if cast with metal on the dull side, would prove to be scrap when it was machined. There was often gas passing through the metal and it was only by getting it away that a good casting could be made.

Need for Correlation of Methods

THE PRESIDENT said there were many points raised by the lecturer with which he agreed, though there were also some with which he disagreed. In his opinion, the presence of gas was a very important and disastrous thing in the foundry. In the past they had been very much indebted to the skill of the old moulders, but the problem which arose was with regard to the younger men who were being trained. An attempt was being made to educate them with respect to the effect of gas in metals, but they did not seem to be taking sufficient interest in the subject. Consideration must be given to the gases created by the metals themselves, as well as by sands and cores.

All foundries seemed to pursue different methods, and there would appear to be a necessity for stan-

dardisation of gas control. Personally, he did not believe in putting in a lot of risers on a job, and if he could possibly cast a job without them he did. He liked to put more head of metal on the mould and squeeze the gases through the sand as far as this was possible. Some moulders would want a cinder bed, but his firm had cast a 15-ton job and there was not a single cinder used for it. On the other hand, he had seen men turn out a 30-ton job and fill the mould with ashes. One man would not use sprigs, while another would. The whole subject required to be placed upon a scientific basis so that this country could turn out the finest possible castings. It was to be hoped that all the young men who were now entering the industry would attend the meetings of the Branch and benefit from the knowledge which would be made available to them.

Data Sheet

Alar, Limited, of 35, New Broad Street, London, E.C.2, have just published a useful addition to their series of data sheets. This new one covers aluminium alloys for cast pistons, and does so by including, with appropriate reference to the germane specifications, four standard alloys. For these alloys the sheets give the chemical composition, mechanical properties (including strength at elevated temperatures), physical properties, machineability, anodising, casting characteristics, heat-treatment and applications. Though these data sheets in appearance remind one of legal documents, the reviewer quite approves of this method of presentation, as showmanship is unnecessary for this kind of technical service. Readers manufacturing light-alloy pistons should certainly ask Alar, Limited, to favour them with a copy.

The Engineering Properties of Meehanite

(*Continued from page* 372)

which the values are maintained to standard. It is vital to the engineer that he can, for design purposes, depend upon the castings having properties strictly in accordance with specification. This is accomplished in the manufacture of Meehanite castings by the application of statistical quality-control systems. The known properties of the frequency distribution curve are employed to determine the limits within which all test values should lie.

The engineer, by specifying the exact requirements in regard to strength or other properties, and giving details of the conditions of service the casting will be required to meet, will enable the foundry to supply the material that experience has shown to be best suited to those conditions. Increased collaboration between designer, engineer, metallurgist and founder in the selection of the material and designing to meet the desired service duty will result in the production of castings which can be depended upon to fulfil requirements.

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

ADDITION OF OXYGEN TO THE CUPOLA BLAST

To the Editor of THE FOUNDRY TRADE JOURNAL

SIR,—The article by Mr. J. Blakiston on the Addition of Oxygen to the Cupola Blast, on page 289 of the JOURNAL for March 31, has been read with interest, and experience at the Yorkshire Steel Foundry of Catton & Company, Limited, confirms in general terms the advantages and disadvantages which Mr. Blakiston lists.

I would, however, seriously question the statement that "if inferior-grade oxygen were available at, say, 15s. per 1,000 cub. ft., the process could be rendered a commercial proposition." Oxygen is available to industry at somewhat more than this figure, but even a reduction to 15s. would still leave the process far from being a commercial proposition in the sense that appreciable savings in other costs are obtained—and that is the vital factor in iron and steel making to-day.

The price of oxygen to industry will have to be reduced very considerably—I would say to as low as 5s. per 1,000 cub. ft.—before any large-scale applications can take place. Even a modified cupola design cannot make iron-making cheap when oxygen is very expensive.—Yours, etc.,

L. J. A. HAYWOOD, A.I.I.A.,
Chief Chemist and Metallurgist.

Catton & Company, Limited,
Yorkshire Steel Foundry,
Leeds, 10.

April 13, 1949.

New Catalogues

Light Alloy Castings—Carrying this captain, "Components for the Electrical and Wireless Industry," High Duty Alloys, Limited, of Slough, have issued a particularly pleasing 16-page well-illustrated booklet. The cover is liberally decorated with red spots. This spotting is becoming quite fashionable nowadays for trade literature and, whilst the reviewer appreciates the sense of freshness it bestows, he hopes that this vogue will not be overdone.

Welding Rods. A 16-page, nicely illustrated pamphlet has been issued by the Suffolk Ironfoundry (1920), Limited, of Stowmarket. The basic principles of low-temperature welding are well described and illustrated, except for the diagram on page 3, which for the sake of clarity could be replaced with advantage by the redrawn version used in Mr. Tibbenham's well-known book on the "Welding of Cast Iron." The material discussed carries the trade name of Sifbronze and is a popular rod for the welding of cast iron or steel. By way of illustration, both fabricated components and repaired casting are shown, using very largely a yellow background. It is thought that a pale shade could be used to give a more pleasing effect—a feature noticed on the back cover, where, in the copy under review, less inking is apparent.

The National Brassfoundry Association

The Annual General Meeting of the National Brassfoundry Association was held on April 12. The fifty-first Report of the Association was presented and from it we make the following abstracts:—

Copenhagen Exhibition

Perhaps the most important event of the year was the joint stand taken at the British Exhibition in Copenhagen, September-October. A large and most impressive stand was taken, and the various sections were represented separately.

The immediate results of the Exhibition as a whole were encouraging, in that the Danish Government has increased its import licences by £25 millions. Although members were not large participators in this increase as a trade, they will in consequence of it, enjoy the increased imports of Danish foodstuffs, and can reflect with satisfaction that they helped in no small measure towards the overall success of an enterprise that helped to restore trade between this country and the Continent. Some members, especially those who energetically followed up inquiries, have expressed themselves as very satisfied with the trading results of the Exhibition.

Membership

The offices of the Association have been transferred to a new and self-contained suite at 30, Waterloo Street, Birmingham. Many members generously contributed to the furnishing of the new offices and the Report officially records the thanks of the members.

For the first time for several years membership has undergone a slight recession, similarly to the experience of most trade associations. This is partially due to the ending of Excess Profits Tax and more probably to the fact that with the relaxing of some controls, firms not normally likely to be in membership, having very slight connection with the trade, have no further need of the Association's services.

On the other hand, the following new members were elected:—Atlas Brassfoundry (B'ham), Limited (Builders' Section), Birmingham; MetaPlast Hardware Company, Limited (Stamped and Cabinet), Liverpool; Pinfold & Parr, Limited (Water and Steam), Birmingham; and W. Markes & Company, Limited (Water and Steam), Birmingham. Membership now stands at the very satisfactory figure of 244.

The Report records, with great regret, the passing, on November 27, of Mr. R. G. E. Freeman, at an advanced age. Mr. Freeman, formerly a director of Evered & Company, Limited, became President of the Association in 1919, and, on the death of Mr. J. W. Madeley, in 1923, undertook temporarily the office of Director. He was so successful and so universally liked that he was persuaded to remain in that office until his retirement in 1937. Thus, nobody has served the Association for so long, or with greater distinction.

Sectional Work

Some concern may be felt in the Water and Steam Section as a result of the precipitate introduction of the new B.S. 1010 Tap, whereby much wastage will result. Distributors, as well as manufacturers, are involved, since it is probable that stocks now held will not all be disposed of. Recent years have proved that the M.o.H. Tap is fully adequate to all demands made upon it and is substantially heavier than the usual foreign standards and so, not only is our home trade economy impaired by the ill-timed introduction of this over-elaborate specification, but our export opportunities are correspondingly impaired. The most energetic representations to the Ministry of Health and the British Waterworks' Association were unavailing.

Brass Saga

Good progress has been made towards the end of the year on the history of the trade, which is now in its final stages of preparation, and which has every prospect of proving a most interesting and worthwhile production.

Festival of Britain, 1951

Several members have expressed interest in displaying their wares in the various exhibitions of British manufactures to be held during the 1951 Festival. Some concern is felt, however, lest choice of design should be left to an *ad hoc* committee of the Council of Industrial Art, rather than that firms themselves should have that freedom of selection that comes from commercial experience and craftmanship.

Federation of British Industries

The Secretary continues to serve on the Grand Council and the Overseas Policy Committee and he has been called also to the *ad hoc* Committee on Controls, which has brought about so many relaxations during the past year. The efficiency and value of the Federation's service to member-Association grows with the years.

West Midland Foundry Advisory (Recruitment and Training) Committee

A foundry school at West Bromwich, established by this body (of which the Association is a member), has enjoyed considerable success, and the services are commended to members.

Foundry Industries Liaison Committee

During the year, we became members of this committee.

Census of Production

Some considerable discussion took place regarding this matter which became law towards the end of the war. The natural objection of firms to give such information as is called for by such inquiries produced much argument. Thanks to some excellent negotiations carried out by Mr. E. C. B. Rowley and others, the size of the forms required was reduced to little more than a fifth of the original requirements, and the good sense of most members has caused them to collaborate.

The Report is signed by Mr. Thomas R. Carpenter, President, and Mr. Edgar N. Hiley, Secretary.

MR. C. H. ONIONS, a director of Onions & Sons, Limited, Moxley, Wednesbury, was elected chairman of the Wolverhampton Branch of the Institute of Welding on April 13 and thus he retained his record of being continuously in office since the formation of the branch.

Socialists Threaten Shipbuilding

"If Private Enterprise Fails"

Cement and all "suitable" minerals are among the industries and services which will, it is proposed, come under State ownership if the Labour Party is returned to power at the next General Election. A "careful examination" of the chemical industry, which "contains a number of monopolistic concerns such as Imperial Chemical Industries," is also contemplated, and if it should prove necessary to "assure vital national interests," there would be transferred to public ownership any appropriate sections of this key industry.

For the shipbuilding and shiprepairing industry a Development Council will be established, and, "if private enterprise fails, Labour will not hesitate to take all steps necessary to ensure that British shipbuilding is never again neglected."

These Socialist plans are revealed in a policy statement issued on April 12. It is being submitted by the National Executive Committee for discussion at the annual conference of the Labour Party to be held at Blackpool in June. From the discussion there will be drafted the final programme for the General Election.

The statement, which is called "Labour Believes in Britain," points out that unless there is economic necessity, there is no reason for always socialising whole industries. It adds: "For private and public enterprise to compete fairly with each other can be good for both."

Policy for Private Industry

The party's policy for private industry is described as follows:—(1) Controls needed for economic planning will be permanently retained to ensure that industry serves the public interest, while other controls are pruned and removed; (2) assistance will be given to raise the efficiency of competitive concerns, particularly the small and medium manufacturers, who are genuinely striving to increase production; (3) where private industry, even with this assistance, is failing to meet the needs of the nation, new public enterprises will be started; (4) monopolies whose growth is a danger to the community will be made to conform to the public interest.

Grounds for starting competitive public enterprises will be as follow:—If, after investigation by the Monopolies and Restrictive Practices Commission, those operating the restrictions refuse to mend their ways; if, despite adequate raw materials and labour supplies, there is a persistent shortage of any product vital to national need; if, to maintain a high level of employment further industrial development is needed in a development or other area; if, under the auspices of a development council or otherwise, a demonstration plant is needed to stimulate inefficient producers; if new products of social value are not being manufactured by private enterprise.

The statement adds that the Government will take practical steps to prevent monopolies from continuing to exploit the public. Each monopoly must be considered on its merits and the appropriate policy applied according to the circumstances of the industry in which it operates.

More Steel Output Records

Scrap Supplies Well Maintained

More steel output records have been established. Production in March was at an annual rate of 16,269,000 tons, which was higher than the previous best level (set up in the previous month) of 16,176,000 tons. The annual rate of output of 15,850,000 tons for the first quarter of the year was by far the highest quarterly figure ever recorded. This is a very encouraging start to the year and it means that the rate of production so far has been well up to the target level of 15¼ to 15½ million tons for the full year. Later, of course, output will be affected by holidays.

Pig-iron production was affected in March by a number of furnaces going out for relining. These are expected to be back in production shortly and, with an increase in iron-ore supplies from abroad during the summer period, pig-iron output should again expand. The British Iron and Steel Federation states that home scrap supplies have been well maintained as a result of the drive and imports are being increased from 20,000 tons a week to 30,000 tons. This expansion in raw material supplies is needed to arrest the seasonal fall in stocks which occurs during the winter months.

Latest steel and pig-iron output figures (in tons) compare as follow with earlier returns:—

	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1949—January ..	178,100	9,262,000	288,500	15,002,000
February ..	181,200	9,422,000	311,100	16,176,000
March ..	178,800	9,295,000	312,900	16,269,000
1st qtr. ..	179,300	9,324,000	304,800	15,850,000
1948—January ..	167,800	8,726,000	280,600	14,589,000
February ..	176,300	9,169,000	289,400	15,049,000
March ..	178,900	9,303,000	290,700	15,117,000
1st qtr. ..	174,700	9,084,000	287,200	14,933,000

Cost of Steel for Shipbuilding

At a meeting of the Executive Council of the Chamber of Shipping of the United Kingdom the withdrawal by the Government of the steel subsidy and the consequent increases in steel prices, and its effect on shipbuilding costs, was discussed, and it was pointed out that while the average increase in the price of steel is to be 9 per cent. overall, the cost of steel for shipbuilding, which tends to be of the more expensive varieties, will almost certainly be increased by more than the average of 9 per cent.

It was stated that the Chamber of Shipping will do what it can to assist the shipbuilders in keeping the increase for ships to the minimum.

Personal

MR. E. JOHNSSON has been appointed managing director of the Atlas Diesel Company, Limited, Wembley.

MR. B. L. METCALF has resigned from the board of the Brush Electrical Engineering Company, Limited, Loughborough.

MR. T. C. L. WESTBROOK has been appointed a director of S. E. Opperman, Limited, engineers and gear cutters, of Elstree, Herts.

MR. R. E. BARRINGER has been appointed an additional director of the Railway & General Engineering Company, Limited, Nottingham.

MR. D. D. FRAME, chairman of the Hammond Lane Foundry Company, Limited, Dublin, has been elected vice-president of the Federation of Irish Manufacturers.

MR. W. G. OGILVIE, of G. & J. Weir, Limited, engineers and founders, of Glasgow, has been elected chairman of the West of Scotland branch of the Institution of Engineering Inspection.

SIR FRANCIS JOSEPH, having decided to restrict his activities in the city, has resigned from the board of the Rio Tinto Company, Limited, copper smelters and iron-ore merchants, of Port Talbot, Glam.

LT.-GEN. SIR WILFRED G. LINDSELL has resigned from the boards of the National Gas & Oil Engine Company, Limited, and Smart & Brown (Engineers), Limited, owing to pressure of other business.

MR. RICHARD FRITH has received a presentation to mark the occasion of his recent retirement from the service of the Lilleshall Company, Limited, Shifnal, Shrops. He had been with the company since 1889.

MR. JAMES MOODY has been appointed Scottish representative of the National Gas & Oil Engine Company, Limited, Ashton-under-Lyne, and will be in charge of the Glasgow office at 231, St. Vincent Street, C.2.

MISS MURIEL JONES, a director and secretary of Castle Hardware, Limited, and one of four women members of the Wolverhampton Chamber of Commerce, has been elected president of the Junior Chamber of Commerce.

ALDERMAN R. IRVIN, chairman of the Shields Engineering & Dry Dock Company, Limited, North Shields, is to be Mayor of Tynemouth for the coming municipal year, which is being celebrated as Tynemouth's 100th year as a borough.

MR. F. GURNEY has been appointed assistant manager, home sales, of the Metropolitan-Vickers Electrical Company, Limited. MR. F. J. B. BARRY, hitherto assistant sales manager, succeeds Mr. Gurney as sales manager, plant department.

MR. GEORGE PATON, managing director of the Yorkshire Switchgear & Engineering Company, Limited, Leeds, has returned from a 15,000-mile tour of oilfields in Venezuela and the Dutch West Indies, where his firm has contracts valued at £500,000.

MR. ALEX STEWART, a director and secretary of M. Cockburn & Company, Limited, brass and iron founders, etc., of Falkirk, was guest of honour recently at a complimentary dinner given by the firm on his retiral after 61 years' service. Mr. R. L. Hunter, managing director, who presided, made a presentation on behalf of the management.

MR. C. E. KNIGHT is relinquishing the position of assistant director of the Combustion Engineering Association, which he has held for the past 2¼ years, to take up a post in the London office of Davidson & Company, Limited, Sirocco Engineering Works, Belfast. Mr. Knight has also held the position of secretary of the Underfeed Stoker Makers' Association.

Metalclad's Production Facilities

George Cohen, Sons & Company, Limited, announces that it has long been evident that the buildings and other facilities at the premises of its subsidiary, Metalclad, Limited, at Neath, are far from ideal for efficient production of woodworking machines in the quantities needed to ensure economical manufacture. At present all administrative work is carried out at Neath, while machining and assembly are done both here and at Stanningley—within the works of the parent concern. As far superior manufacturing facilities are now available at Stanningley, the board has decided to concentrate there both its administration and production. The transfer will be gradual over the next few months and neither output nor service will be affected.

The company's newly equipped foundry at Beaufort Works, Morriston, has now commenced production. As the output increases this will provide all the iron castings required by Metalclad, Limited, and the foundry will also have sufficient capacity to undertake outside work.

Zinc Offer Accepted

The directors of the Consolidated Zinc Corporation announce that the offer to members of the Zinc Corporation, Limited, to exchange their stock and shares for shares in Consolidated Zinc has been accepted by the holders of about 95 per cent. of each class; accordingly, the offer becomes unconditional. Consolidated Zinc is prepared to treat as valid any further acceptances if received by May 9. The company has now been made public, and its authorised capital increased to £20,000,000. Application will be made forthwith to the stock exchanges at London, Adelaide, Melbourne, and Sydney for permission to deal in the issued preference and ordinary shares of the Consolidated Zinc Corporation.

Festival Engineering Exhibition

Mr. Herbert Morrison, Lord President of the Council, has intimated in a letter to Mr. William Hannan, M.P. for Maryhill, that an exhibition of the heavy engineering achievements of the United Kingdom is to be held in Glasgow in 1951 as part of the Festival of Britain.

News in Brief

A NEW FOUNDRY is to be built at Hargraves Street, Red Bank, Manchester, for Fry's Metal Foundries, Limited.

THE HAMWORTHY ENGINEERING COMPANY, LIMITED, is to erect a new foundry, patternshop and canteen at Mannings Heath Road, Poole.

BRUSH ELECTRICAL ENGINEERING COMPANY, LIMITED, Loughborough, has been fined £50, with 2s. 6d. costs, for having machinery insecurely fenced.

AIR CONTROL INSTALLATIONS, LIMITED, Ruislip, has opened a branch office at 19, Temple Street, Birmingham, 2 (telephone: Midland 2546), with Mr. A. W. Evans as manager.

THE HEAD OFFICE of the Woodall-Duckham Vertical Retort & Oven Construction Company (1920), Limited, is now at 63-77, Brompton Road, London, S.W.3 (telephone: Kensington 6355).

FUTURE COURSES at the National Foundry College, which is housed in the Wolverhampton and Staffordshire Technical College, may include visits abroad, probably to Belgium or Sweden.

MR. JACK JONES, Joint Parliamentary Secretary to the Ministry of Supply, visited the works of Mirrlees, Bickerton & Day, Limited, heavy Diesel-engine builders, of Stockport, on April 13. After addressing the employees he toured the factory.

SPEAKING AT a dinner at the annual conference of the Electro Depositors' Technical Society at Buxton recently, the Master Cutler, Lt.-Col. J. P. Hunt, said there was only one Sheffield and the name alone was a hallmark of quality. That quality was unbeatable and unequalled throughout the world.

C. A. PARSONS & COMPANY, LIMITED, Newcastle-upon-Tyne, has received a contract for the building of the second steam turbine required for the Ontario Hydro-Electric Commission's new £10,000,000 plant at Toronto. The company now has orders worth £1,200,000 in hand for the Commission.

THE EXECUTIVE COMMITTEE of the British Valve Manufacturers' Association recently visited the works of Glenfield & Kennedy, Limited, hydraulic engineers and foundrymen, of Kilmarnock, to study new production methods. The party was accompanied by Mr. E. Bruce Ball, of Glenfield & Kennedy, Limited, who is chairman of the Association.

IN HIS PRESIDENTIAL ADDRESS to the annual spring meeting of the Institution of Naval Architects, Admiral of the Fleet Lord Cunningham of Hyndhope, said that some 52 million tons of shipping had passed through the repairing yards of the country in 1948, and at the end of the year just over 2 million tons—52 per cent. of the world total—was under construction in British yards.

HADFIELDS, LIMITED, Sheffield, proposes to develop the business of Millspaugh, Limited (one of the company's subsidiaries which has been established in its Sheffield works since 1933), by turning the firm from making parts for paper-making machinery to the production of whole machines which cost up to £120,000 each. The proposed development will cost an estimated £500,000.

BRITISH METAL CORPORATION (SOUTH AFRICA) (PTY.), LIMITED, has been formed in Johannesburg by the British Metal Corporation, Limited, to carry on business as non-ferrous metal merchants. The company is also the sole licensee in South Africa and the Rhodesias of Colliery Engineering, Limited, Sheffield, and Aerex, Limited, Sheffield (ventilating fans, mine and industrial ventilating plants).

THE STRIKE at the Barton, Manchester, factory of Platt Bros. & Company, Limited, textile and general engineers, where 1,500 workers stopped work following the dismissal on redundancy grounds of 294 workers, is over. The decision to return was announced after a mass meeting of strikers had authorised a deputation to approach the management with an undertaking that redundancy notices would be cancelled and discussions opened on the question of a four-day working week.

Recent Wills

STONEHAM, WILLIAM, late financial comptroller of the British Thomson-Houston Company, Limited, Rugby £9,184

MCLACHLAN, WILLIAM, managing director of Paul & McLachlan, Limited, ironfounders, of Denny, Stirlingshire £21,098

WILDER, P. W., a director of Walter Wilder & Sons, Limited, agricultural engineers and ironfounders, of Wallingford, Berks £19,793

HARGREAVES, J. W., late director of C. A. Harnden, Limited, engineers and manufacturers of paper-cutting machines, of Hyde, Ches £77,078

TRAFFORD, C. E., of Geldeston, Norfolk, a director of the Mining Corporation of Canada, Limited, and the Normetal Mining Corporation, Limited £13,389

TAYLOR, WILLIAM, vice-chairman of Clyde Crane & Booth, Limited, Gateshead, senior director of Clarke, Chapman & Company, Limited, manufacturing marine engineers, etc. £37,512

STEVENSON, ALLAN, deputy chairman of David Rowan & Company, Limited, marine engineers and boilermakers, of Glasgow, late deputy director of merchant shipbuilding and repairs at the Admiralty £12,940

GLEDHILL, SAMUEL, a director and general manager of Kitchen & Wade, Limited, manufacturers of drilling and boring machines, of Halifax, and a director of Ormerod Shapers, Limited, machine-tool makers, of Hebden Bridge, Yorks £16,963

Recent Shipbuilding Orders

The following are among shipbuilding orders recently announced:—

FERGUSON BROS. (PORT GLASGOW), LIMITED, a steam tug for the British Tanker Company, Limited.

WILLIAM DOXFORD & SONS, LIMITED, Sunderland, two 10,000-ton ships for T. & J. Harrison, Liverpool.

JOHN LEWIS & SONS, LIMITED, Aberdeen, two trawlers for the Iago Steam Trawler Company, Fleetwood.

Obituary

MR. JOHN RAMAGE WADDELL, who died on March 29, was manager of the Glasgow branch of Milner's Safe Company, Limited, Highgate Village, London, N.6.

DR. PHILIP EGERTON SHAW, Emeritus Professor of Physics at Nottingham University, died on April 10. Dr. Shaw published many Papers on the research work he carried out on fine measurements in engineering with electric micrometers and on frictional electricity.

MR. J. CLARE, sales engineer for Yorkshire and the North-East Coast during the past 14 years of Craven Bros. (Manchester), Limited, machine-tool manufacturers, ironfounders, etc., of Reddish, near Stockport, died on April 4. The office which Mr. Clare occupied at Church Street, Sheffield, will be discontinued, and inquiries for plant or service should be sent direct to the head office at Reddish.

MR. KARL BROZYNA, chief of the research department of the Austin Motor Company, Limited, Birmingham, has died at the age of 71. He joined the company as chief engineer in 1914. He became manager of the inspection department and head of the metallurgical department, and finally chief of the research department. Well known in automobile engineering circles, he was awarded, in 1936, the Crompton medal by the Institute of Automobile Engineers.

MR. HENRY MAIN was found dead in his railway sleeping compartment near Edinburgh on April 8. He had been a prominent figure in shipbuilding circles for many years. In addition to being managing director of the Caledon Shipbuilding & Engineering Company, Limited, Dundee, Mr. Main was a director of Sir W. G. Armstrong Whitworth & Company (Shipbuilders), Limited, and other companies. He had been actively associated with the work of the Shipbuilding Employers' Federation and he became its president in 1939. In March of last year Mr. Main was elected vice-president of the Shipbuilding Conference, and less than two months ago he was re-elected to that office for 1949-50. He was appointed Regional Director (Merchant Shipbuilding and Repairs), East of Scotland, in March, 1940, and rendered valuable assistance to Sir James Lithgow, Bt., who was Controller of Shipbuilding and Repairs. Mr. Main, who was 60 years of age, held many other positions in industry from time to time, while he was also associated with a number of technical organisations.

Exports to Canada and U.S.

The President of the Board of Trade is calling a meeting next Tuesday, " to set in motion the campaign in this country, and in Canada and the United States, to increase our exports to those vital markets." Leading representatives of trade, finance, and industry, the trade unions and the co-operative movement, have been invited to the meeting. Mr. Wilson has sent them a telegram saying that he hopes to obtain ideas " from every quarter of our industrial community on how the job should be tackled and how far, and in what ways, the Government may help."

R. Crittall's Reconstruction Scheme

Plan for Capital

Full details of the scheme of arrangement reached between Richard Crittall & Company, Limited, Grierson, Limited, and Air Ducts, Limited, and the unsecured creditors of the three companies were made known on April 11. If the scheme is approved, the issued share capital of Richard Crittall & Company will be £350,000 in 7,000,000 ordinary 1s. shares, which will be allocated as follows:—To the preference shareholders, 750,000 shares (£37,500), *i.e.*, one and a half ordinary shares for each preference £1 share held; to the ordinary shareholders, 250,000 shares (£12,500), *i.e.*, one ordinary share for every four ordinary 1s. shares held; to Industrial & Commercial Finance Corporation, Limited, and Securities Agency, Limited, 6,000,000 shares (£300,000) in respect of the £300,000 new money which they are to subscribe.

The general body of the unsecured creditors of Richard Crittall & Company, Grierson, Limited, and Air Ducts, Limited, would, subject to certain special exceptions, receive and be bound to accept in full satisfaction of their claims 4s. 6d., 7s. 6d., and 5s., respectively, in the £ of the sums owing to them. The directors are of the opinion that unless the scheme is approved there is no alternative but to liquidate Richard Crittall & Company and its remaining subsidiaries, in which event, it is stated, there will remain little or nothing for the unsecured creditors, and nothing whatever for the shareholders.

If the scheme becomes operative, Mr. H. Victor Cozens (the present chairman), Mr. F. S. Towle, Mr. T. C. L. Westbrook, and Mr. W. A. McPhail (the present managing director) will retire from the boards of the companies. The Industrial & Commercial Finance Corporation and Securities Agency have nominated Mr. Geoffrey Eley as chairman and Sir George Cuffe as managing director, and they, together with Mr. J. P. Hamill, Mr. W. R. Cox and Mr. G. F. Wattears will constitute the new board.

Gazette

MR. F. C. ORMEROD has been released from his position as liquidator of Pilot Engineers, Limited.

MR. H. P. NAUNTON has been released from his position as liquidator of Plant Maintenance, Limited.

EMSCOTE METAL PRODUCTS, LIMITED, is being wound up voluntarily. Mr. R. F. Bendall, 174, Edmund Street, Birmingham, 3, is the liquidator.

PLASTIC MOULDS & PRESS TOOLS, LIMITED, is being wound up voluntarily. Mr. A. W. Hunter, 185-188, High Holborn, London, W.C.1, is the liquidator.

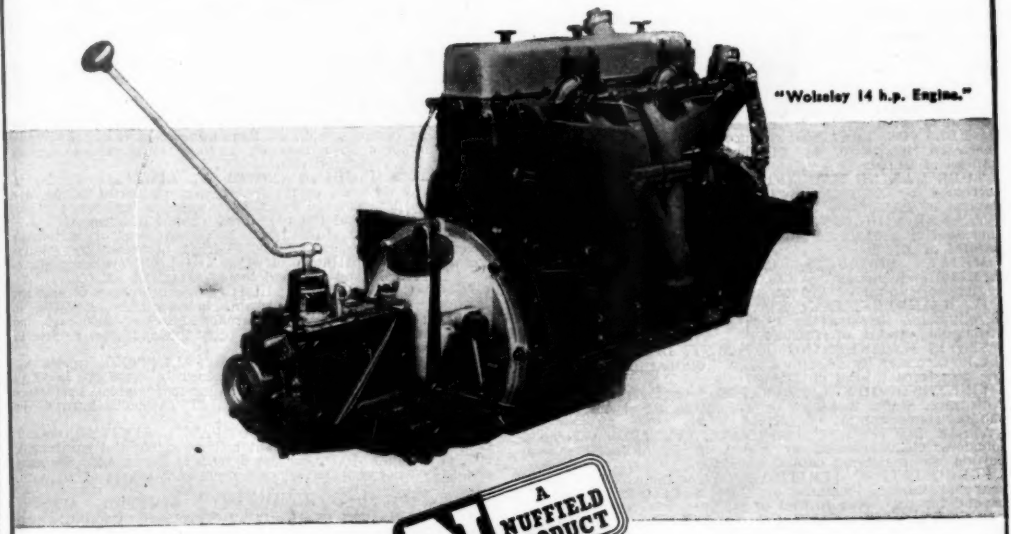
BUCKLEYS, LIMITED, weldless steel-tube manufacturers, is being wound up voluntarily. Mr. E. H. Brown, 19A, Coleman Street, London, E.C.2, is the liquidator.

KEATS & BEXON, LIMITED, boot and shoe machinery manufacturers, is being wound up voluntarily. Mr. J. B. Carter, 23, King Street, Nottingham, is the liquidator.

LOWESTOFT HAMILTON ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Mr. G. W. Boocock, 631, Chatsworth Road, Chesterfield, is the liquidator.

W. H. JOHNSON (SANITARY ENGINEERS), LIMITED, is being wound up voluntarily. Mr. J. M. Peacock, 44, Birkdale Road, Abbey Wood, London, S.E.2, is the liquidator.

JABEZ BATE & COMPANY, LIMITED, engineers, machinists, etc., is being wound up voluntarily. Mr. F. R. West, 380, Stratford Road, Birmingham, 11, is the liquidator



"Wolseley 14 h.p. Engine."

A NUFFIELD PRODUCT

Using

STANTON-DALE

REFINED PIG IRON

USED AND RECOMMENDED
FOR ALL HIGH-DUTY
ENGINEERING CASTINGS

THE STANTON IRONWORKS COMPANY LIMITED, Nr. NOTTINGHAM

Increases of Capital

Details of increased capital have been announced by the following companies:—

BURLING, LIMITED, engineers, etc., of London, S.E.5, increased by £900, in £1 shares, beyond the registered capital of £100.

H. MULLINS (BARBY), LIMITED, engineers, etc., of Colne, increased by £4,500 in £1 shares, beyond the registered capital of £500.

NEELANDS, LIMITED, engineers, etc., of Middlesbrough, increased by £4,500, in £1 shares, beyond the registered capital of £1,500.

TUBE MAKING MACHINES, LIMITED, LONDON, W.C.2, increased by £15,000, in £1 shares, beyond the registered capital of £5,000.

TEANBE MOULDING SUPPLIES, LIMITED, Beckenham, increased by £602, in £1 ordinary shares, beyond the registered capital of £1,000.

METAL PRODUCTS COMPANY (WILLENHALL), LIMITED, increased by £80,000, in £1 shares, beyond the registered capital of £20,000.

H. BRINDLEY, LIMITED, engineers, founders, etc., of Birmingham, increased by £1,000, in £1 shares, beyond the registered capital of £10,000.

STOVIS ENGINEERING COMPANY, LIMITED, London, S.E.15, increased by £300, in £1 "A" ordinary shares, beyond the registered capital of £2,000.

VICKERS-GOODWIN, LIMITED, engineers, etc., of Kidsgrove, Staffs, increased by £25,000, in £1 shares, beyond the registered capital of £50,000.

ATLAS EQUIPMENT (LONDON), LIMITED, engineers, founders, etc., increased by £1,900, in £1 ordinary shares, beyond the registered capital of £100.

FERROSTATICS, LIMITED, engineers, etc., of Glossop, near Manchester, increased by £500 in £1 ordinary shares, beyond the registered capital of £3,000.

GOODE'S ENGINEERING COMPANY, LIMITED, Royston, Herts, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £5,000.

BIRMINGHAM CORRUGATED IRON COMPANY, LIMITED, Widnes, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £40,000.

LIVER ALUMINIUM PRODUCTS, LIMITED, Kirkby Trading Estate, near Liverpool, increased by £1,000, in £1 shares, beyond the registered capital of £1,000.

VISCO ENGINEERING COMPANY, LIMITED, Croydon, increased by £20,000, in £1 4½ per cent. cumulative preference shares, beyond the registered capital of £50,500.

NU-WAY HEATING PLANTS, LIMITED, Harborne, Birmingham, increased by £11,937 10s., in 238,750 ordinary shares of 1s. each, beyond the registered capital of £10,062.

DOUGLAS MORRIS INDUSTRIES, LIMITED, machinery manufacturers, etc., of London, S.W.1, increased by £9,900, in £1 ordinary shares, beyond the registered capital of £100.

COLLIER DOWELL METAL FINISHES, LIMITED, London, W.1, increased by £4,900, in £1 5 per cent. cumulative redeemable preference shares, beyond the registered capital of £100.

WALKERS, PARKER & COMPANY, LIMITED, lead manufacturers, etc., of London, E.C.2, increased by £1,600,000, in £1 ordinary shares, beyond the registered capital of £400,000.

TINSLEY PRECISION ENGINEERING COMPANY, LIMITED, London, E.C.4, increased by £1,000, in £1 10 per cent. second preference shares, beyond the registered capital of £1,000.

E. H. BENTALL & COMPANY, LIMITED, engineers, etc., of Heybridge, Essex, increased by £150,000 in £1 5 per cent. cumulative preference shares, beyond the registered capital of £150,000.

FERGUSON PAILIN, LIMITED, switchboard manufacturers, etc., of Higher Openshaw, Manchester, increased by £100,000, in £1 ordinary shares, beyond the registered capital of £500,000.

MAXWELL, MANNERS & PRING, LIMITED, engineers, etc., of Southend-on-Sea, increased by £12,500, in £1 shares (1,000 ordinary and 11,500 "B" preference), beyond the registered capital of £27,500.

WADE ENGINEERING, LIMITED, Gatwick Airport, Surrey, increased by £24,501, in 22,000 5½ per cent. cumulative preference and 2,501 ordinary shares of £1 each, beyond the registered capital of £2,500.

CONCORDIA ELECTRIC WIRE & CABLE COMPANY, LIMITED, Long Eaton, near Nottingham, increased by £100,000, in 100,000 unclassified shares of £1 each, beyond the registered capital of £100,000.

BECK & COMPANY (METERS), LIMITED, London, S.W.16, increased by £349,900, in 174,950 £1 5½ per cent. cumulative preference shares and 349,900 10s. ordinary shares, beyond the registered capital of £100.

LAN-BAR, LIMITED, designers and makers of aluminium and other castings, etc., of Birmingham, increased by £3,000 in £1 6 per cent. redeemable cumulative preference shares, beyond the registered capital of £3,000.

BELLOW MACHINE COMPANY, LIMITED, Leeds, increased by £199,900, in 799,200 ordinary shares of 2s. 6d. and 100,000 5½ per cent. cumulative redeemable preference shares of £1 each, beyond the registered capital of £100.

F. GRAUCOB, LIMITED, manufacturers of automatic vending machines, of Elland, Yorks, increased by £30,000, in 20,000 participating preference and 10,000 ordinary shares of £1 each, beyond the registered capital of £50,000.

BESTWOOD COMPANY, LIMITED, constructors of engines, machinery, etc., of Nottingham, increased by £269,500, in 296 7 per cent. cumulative preference shares of £100 each and 239,900 ordinary shares of £1 each, beyond the registered capital of £500.

W. J. FRASER & COMPANY, LIMITED, engineers, founders, etc., of Dagenham, increased by £106,500, in 75,000 5½ per cent. second cumulative (non-redeemable) preference shares and 31,500 ordinary shares of £1 each, beyond the registered capital of £51,807.

ELASTIC RAIL SPIKE COMPANY, LIMITED, manufacturers of railway permanent rail materials and equipment, etc., of London, E.C.3, increased by £10,000, in 4,000 ordinary and 6,000 7 per cent. redeemable preference shares of £1 each, beyond the registered capital of £25,500.

NEW CONVEYOR COMPANY, LIMITED, Oldbury, Worcs, increased by £75,000, in £1 5 per cent. cumulative participating preference shares, beyond the registered capital of £50,000. On January 28, 1949, the Industrial & Commercial Finance Corporation, Limited, was allotted 75,000 preference shares.

J. & H. McLAREN, LIMITED, agricultural engineers, etc., of Leeds, increased by £100,000, in £1 ordinary shares, beyond the registered capital of £150,000. On November 8, 1946, Associated British Engineering, Limited, held 48,205 ordinary shares, and the Prudential Assurance Company, Limited, held 30,000 preference shares. A further 49,995 ordinary shares were allotted to Associated British Engineering, Limited.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference E.P.D. or C.R.E. can be obtained from the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, London, S.W.1.

BELFAST. April 23—Supply of brass and copper fittings, etc., cast-iron pipes and fittings, compo pipe and pig-lead, iron castings, etc., for the Town Council. The Engineer and Manager, Gas Works, Ormeau Road, Belfast.

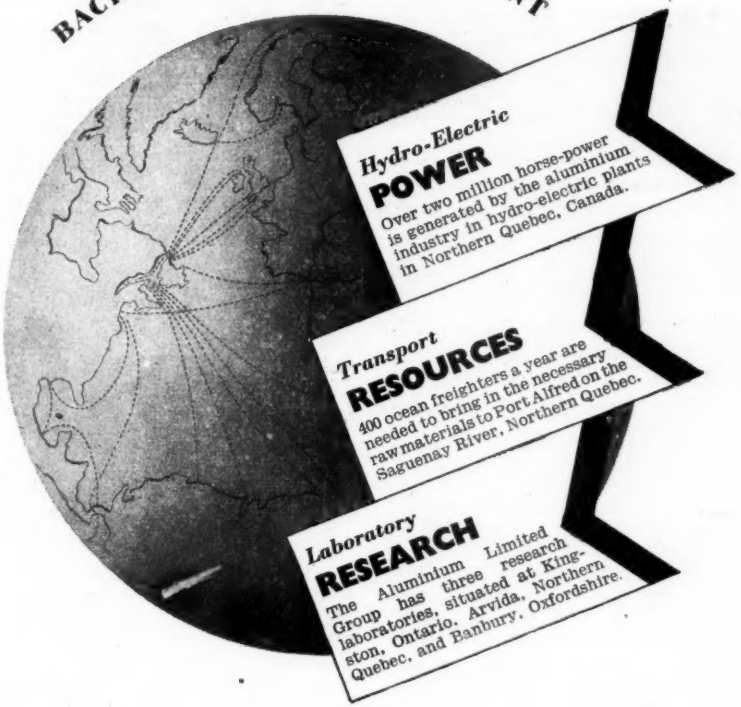
CANNOCK, May 7—Supply of tools, castings, etc., for the Urban District Council. Mr. E. Lomax, engineer and surveyor, Council House, "The Green," Cannock.

GODALMING, May 6—Supplying and laying of 470 yds. of 4-in. dia. spun-iron water mains, for the Borough Council. Mr. C. B. Spivey, water engineer, Municipal Buildings, Bridge Street, Godalming. (Fee £2 2s., returnable.)

LIMERICK, May 27—Supplying and laying of 1,212 yds. of 4-in. dia. cast-iron class C rising main, for the County Council. Mr. P. J. Sheehan, consulting engineer, 47, O'Connell Street, Limerick. (Deposit, £5.)

THE ADDRESS OF Associated Commercial Vehicles, Limited, is now 49, Berkeley Square, London, W.1 (telephone: Regent 2141).

BACKGROUND TO ACHIEVEMENT


Hydro-Electric
POWER
Over two million horse-power is generated by the aluminium industry in hydro-electric plants in Northern Quebec, Canada.
Transport
RESOURCES
400 ocean freighters a year are needed to bring in the necessary raw materials to Port Alfred on the Saguenay River, Northern Quebec.
Laboratory
RESEARCH
The Aluminium Limited Group has three research laboratories, situated at Kingston, Ontario, Arvida, Northern Quebec, and Banbury, Oxfordshire.

One important feature of global geography is that the locations most suitable for large-scale production of virgin aluminium are literally "oceans apart". The reason is the need for cheap and abundant hydro-electric power. Likewise, the principal raw materials of aluminium, such as bauxite and cryolite, are often found commercially in places far distant from the production centres. Transport by sea, land or both, is, therefore, a vast undertaking.

These difficulties overcome, yet another problem arises. For pure aluminium, like pure gold, lends itself only to a limited number of uses. Before it can become sheet suitable for the builder or a high strength casting, aluminium must be alloyed with sister metals, and all manner of physical and mechanical conditions must be investigated before the properties of the metal can be established.

Thus, over the years, a great production organization also becomes an extensive research centre, responsible for seeking and maintaining the highest technological standards.

This, briefly, is the background to the achievements of the Aluminium Limited Group of Companies.

ALUMINIUM UNION LIMITED

The largest distributers of Aluminium and its Alloys in the British Commonwealth

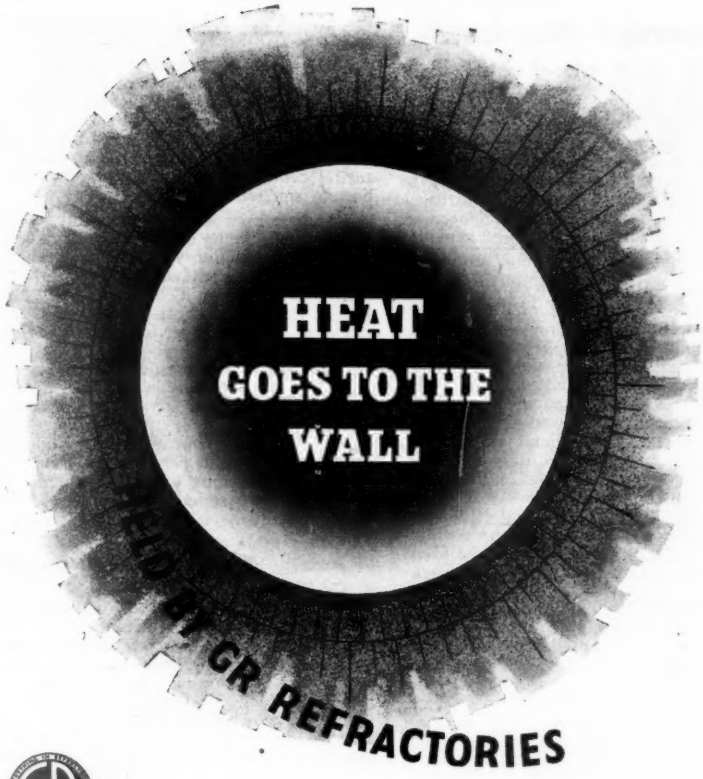
THE ADELPHI, STRAND, LONDON, W.C.2

An ALUMINIUM LIMITED Company

Company News

(Figures for previous year in brackets.)

GESTETNER—Interim dividend of 12½% (same).
PARKINSON & COWAN—Dividend of 7% (6%).
SANGAMO WESTON—Dividend of 17½% (same).
BRADLEY & COMPANY—Dividend of 70% (same).
W. H. DEAN & SON—Interim dividend of 10% (same).
VICKERS—Final dividend of 8¾%, making 12½% (same).
WALMSLEYS (BURY)—Interim dividend of 6% (same).
COLVILLES—Final dividend of 5%, making 13% (same).
POWER SECURITIES CORPORATION—Dividend of 6% (same).
WILLIAM DOXFORD & SONS—Interim dividend of 5% (same).
E. CHALMERS & COMPANY—Interim dividend of 10% (same).
ASSOCIATED ENGINEERING HOLDINGS—Interim dividend of 5% (7½%).
BRITISH OXYGEN COMPANY—Final dividend of 12%, making 20% (same).
BEYER, PEACOCK & COMPANY—Dividend of 5% and bonus of 1% (same).
F. McNEILL & COMPANY—Final dividend of 10%, making 20% (same).
JOHN G. KINCAID & COMPANY—Final dividend of 9½%, making 12½% (same).
A. REYROLLE & COMPANY—Final dividend of 7½%, making 12½% (same).
NEWTON CHAMBERS & COMPANY—Final dividend of 10%, making 15% (same).
WALLIS TIN STAMPING COMPANY—Interim dividend of 33⅓% (same on smaller capital).
W. CANNING & COMPANY—Final dividend of 5% and bonus of 17½%, making 27½% (same).
CAMMELL LAIRD & COMPANY—Final dividend of 7½%, making 12½% (same), and bonus of 3%, tax free (same).
HALESOWEN STEEL COMPANY—Profit for 1948, after depreciation, directors' fees and employees' pensions, £54,819 (£55,156); to taxation, £33,666 (£31,811); net profit, £21,153 (£23,345); brought in, £26,341 (£24,409); total credit, £47,494 (£47,754); final dividend of 15%, making 20% (same).
BEDE METAL & CHEMICAL COMPANY—Trading profit for 1948, £34,306; other income, £1,594; to depreciation, £5,000; taxation, £16,330; profit, £14,570; provision for taxation previous years not required, £1,092; to directors' fees, £2,000; reserve for plant replacement and development, £5,700; dividend of 1s. 6d. per share (same); forward, £10,564 (£11,299, less directors' fees £1,500).
ROBERT STEPHENSON & HAWTHORNS—Trading profit for 1948, £115,973 (£87,293); sundry receipts, £201 (£212); to depreciation, £15,890 (£18,134); directors' remuneration, £3,854 (£3,760); deferred repairs, £3,000 (same); profit, before taxation, £93,430 (£62,611); to taxation, £52,000 (£36,000); general reserve, £30,000 (£15,000); dividend of 5% and bonus of 2% (same); forward, £12,051 (£11,208).
PARKER, WINDER & ACHURCH—Trading profit for 1948, £137,021 (£137,366); other income, £408 (£1,002); to tax, £64,000 (£70,000); deferred repairs, £1,380 (£3,250); net profit, £55,972 (£49,314); dividend and bonus of 35% (same); general reserve, £5,000 (same); dividend equalisation reserve, £10,000 (£5,000); stock reserve, £20,000 (nil); pensions, nil (£8,912); investment reserve, nil (£3,000); forward, £47,187 (£42,533).
GLYNWED TUBES—Consolidated profit for 1948, £624,167 (£660,427); other income, £1,014 (£5); to depreciation, £6,952 (£6,166); directors' emoluments, £15,530 (£14,250); audit, £500 (same); management expenses, £297 (£170); tax, £103,993 (£141,726); future tax reserve, £232,500 (£248,090); leaving £265,409 (£249,530); brought in, £380,290; dividend of 25% (same); forward, holding company, £231,526 (£126,282); subsidiaries £346,423 (£254,008).
WILLENHALL MOTOR RADIATOR COMPANY—Trading profit for 1948, including interest, etc., £49,834 (£37,751); to directors' emoluments, £10,432 (£10,022); depreciation, £3,556 (£3,727); bonus duty on capital issue, £430 (nil); profits tax, £5,000 (£4,076); net profit, £30,416 (£19,926); final dividend of 20%, making 35% (dividend of 20% and bonus of 10%); to reserve for income tax, £12,000 (£10,000); general reserve, £12,000 (£5,000); forward, £4,347 (£3,568).
HUMPHREYS—Trading profit to November 30, 1948, £44,947 (£31,547); other income, £10,269 (£18,546); to directors' fees and emoluments, £5,200 (£6,450); pension of past director, £1,500 (£1,000); interest, etc., £7,544 (£3,778); audit fee, £420 (same); depreciation, £272 (£214); leasehold amortisation, £204 (£203); profits tax, £7,170 (£6,900); income tax, £15,216 (£13,305); profit, £17,690 (£17,833); to loss on sale of Government securities, £3,421 (nil); dividend of 15% (same); forward, £34,343 (£31,349).
CLAYTON DEWANDRE COMPANY—Consolidated accounts for 1948 show net trading profit (including results of subsidiary for 15 months), £178,378 (£103,174, after providing profits tax); to tax, £90,000; interest, £1,848; depreciation of fixed assets, £21,917; net loss on realisation of fixed assets, £1,950; written off patents, £889; deferred repairs, £1,000; net profit, £57,940 (£52,155); dividend of 12% (same); replacement of fixed assets, £25,000; staff pensions, £5,000; reserve, £7,500; forward, £22,537 (£20,115).
TIPPER INDUSTRIES—Consolidated trading profit, etc., for 1948, £75,168 (£61,147); to depreciation, £4,555 (£2,294); auditors' remuneration, £551 (£525); directors, £11,848 (£9,847); taxation (after adjustment for previous year £1,524), £29,464 (£27,427); outside shareholders, £306 (£172); net profits applicable to Tipper Industries, £28,444 (£20,882); to capital reserve, £2,102 (£972); off preliminary expenses, etc., £118 (nil); final dividend of 17½%, making 25% (same); forward, Tipper Industries, £2,137 (£6,589) and retained by subsidiaries £17,853 (£927).
SKEFKO BALL BEARING COMPANY—Trading profit with interest for 1948, after setting aside to stock reserve £200,000 for possible future reductions in stock values, £965,390; to depreciation, £21,918; reserve for replacement of buildings, etc., £119,303; directors' emoluments, £26,091; audit fee, etc., £908; tax, £591,500; leaving £205,670; brought in, £156,361; provisions previously set aside not now required, £150,000; to pension schemes, £37,124; development charges, £15,000; general reserve, £150,000; final dividend of 7d., making 10d. per unit, tax free (same); forward, £176,574.
L. GARDNER & SONS—Consolidated trading profit for 1948, £498,358; to depreciation, £23,874; directors' emoluments, £28,617; audit fees, £1,043; tax, £228,617; leaving £216,207; investment income, £1,026; proportion to outside subsidiary shareholders, £2,415; subsidiary dividends, £4,370; consolidated net profit, £219,188; parent company's profit, after £44,493 retained by subsidiaries, £174,695; brought in, £149,171; to preference dividends, £5,545; ordinary dividend of 50%, tax free (same), £53,451; written back from war contingencies reserve, £1,956; forward, £266,826.
BRITISH UNITED SHOE MACHINERY COMPANY—Consolidated trading profit for 1948, £1,887,626 (£1,820,476); investment income, £8,590 (£12,406); interest and tax reserve interest, £10,571 (£11,735); to depreciation, £288,804 (£234,248); deferred repairs, £9,099 (£5,359); tax, £803,948 (£821,615); leaving £804,936 (£783,398); attributed to minority interests, £1,847 (£3,133); brought in, £1,437,487 (£1,156,933); tax provisions no longer required, £23,388 (£55,505); making £2,263,964 (£1,992,703); to general reserve, £153,812 (£169,720); final dividend of 7½%, making 13½%, tax free (same); forward, £1,724,656 (£1,437,487).
GLENFIELD & KENNEDY—Consolidated net profit for the period ended December 31, 1948, £221,290 (£172,185), which combines the trading results of the parent company and two minor subsidiaries for nine months, and of three major subsidiaries for a full year, compared with full year's results for each company in previous accounts to March 31, 1948; the net profit is arrived at after charging depreciation, obsolescence and taxation and it includes £46,006 (£22,654) in respect of provisions not required and a receipt of a non-recurrent nature; final dividend of 15%, making 20% (10% and bonus of 10%); retained by subsidiaries, £90,036 (£32,674); to plant replacement and contingencies reserve, £30,000 (nil); general reserve, £15,000 (£50,000); forward, £52,741 (£49,956).
ENFIELD ROLLING MILLS—Group trading profit, etc., for 1948, £503,716 (£727,169); other income, £14,914 (£8,062); to depreciation, £83,404 (£48,542); interest, £3,000 (£2,449); 4½% debenture interest, nil (£2,391); directors' emoluments, £27,616 (£27,350); auditors' remuneration, £1,531 (£1,444); preliminary expenses of a subsidiary, £249 (nil); bad debts reserve, £10,000 (same); profits tax, £55,450 (£73,500); income tax, £174,000 (£263,244); obsolescence provision, nil (£5,000); deferred repairs, nil (£35,000); depreciation on buildings, nil (£43,798); off capital and A.R.P., etc., expenditure, nil (£82,873); net profit, £163,380 (£139,640); to preference dividend, £9,900 (£7,425); pension fund, £5,000 (£20,000); general reserve, £100,000 (£197,374); dividend of 5% and bonus of 2½% (same); forward, £97,657 (£72,477).



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And well held by refractories of high uniform excellence which can be depended upon to provide strong, stable and lasting furnace linings: To support a range of products so wide that it covers the requirements of all types of furnaces, G.R. technical experience is available to users in order to assist in the selection of a suitable refractory for any particular application. When you specify 'GR' you enjoy a double service—a dependable product and knowledgeable assistance. That's why it pays to consult G.R.

GENERAL REFRACTORIES LIMITED

GENEFAX HOUSE · SHEFFIELD 10 · TELEPHONE: SHEFFIELD 31113

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Raw Material Markets

Iron and Steel

Most of the foundries utilised the holidays to effect minor repairs and cupola relinings; arrangements were also made for the receipt of materials in an effort to augment the meagre stocks of pig-iron. Supplies of high-phosphorus pig-iron will be affected adversely in the near future due to the blowing-in of two furnaces for relining, and in the case of the general engineering, jobbing and speciality foundries deliveries of hematite have been spasmodic recently due to the prior call of the steel trade.

Current production of castings keeps at a steady pace and, while demands are not excessive, they are generally sufficient to keep the foundries employed to capacity and absorb all available supplies of pig-iron. Light foundries would readily accept additional supplies of high-phosphorus pig-iron, and will need them to expand on present outputs. Some of these foundries are finding it difficult to secure sufficient tonnage for immediate needs. The general engineering, jobbing and speciality foundries are utilising all available tonnages of low- and medium-phosphorus irons and production of these grades is below demand. Hematite has also been difficult. Production consists mostly of the lower silicon grades, which necessitates the use of larger quantities of ferro-silicon at the foundries. The refined grades are being taken up in increasing quantities.

The output of small sections, bars and narrow strip from the light re-rollers continues to show improvement, as a result of increased supplies of steel from abroad. They are receiving their usual tonnages from home sources, but these are quite inadequate. Heavy pressure continues on the mills for all grades of sheets, both black and galvanised, and consumers' requirements are in excess of the improved outputs which have recently been obtained. More steel is required to enable the heavy order-books to be dealt with effectively.

The mills rolling the heavier sizes are better placed for supplies of steel which is enabling them to obtain reasonable outputs in fulfilment of their home and export orders.

Non-ferrous Metals

Conditions in the metal trade were very quiet last week and this week has certainly shown no improvement in view of the fact that a good many factories were closed up to yesterday (Wednesday) morning. Quite apart from the lack of business due to holidays, consumers are unenthusiastic about buying, for on every count they feel that there is wisdom in delaying purchasing as long as possible. Sentiment has, in fact, been reversed and the United States price structure is regarded with suspicion and apprehension. Recent events in America fully justify this assessment of the situation, for commodity prices have sectionally shown great weakness of late. At present, however, there is a slightly steadier tendency; but lead, for example, has not by any means reached a level at which buyers feel they can buy freely. What is not desirable is that the fall should be overdone and a seesaw movement set up. So far this has not happened, but if lead should fall to, say, 12 cents per lb. in the near future, by steps of 1 cent, then there might be a rush. The decline in zinc so far has amounted to 3½ cents, while copper, after an initial fall of ¼ cent, gave way at the end of last week to 21½ cents per lb., this new level being created by a custom smelter.

March copper statistics certainly do not present a picture of declining activity. According to the Copper Institute, production of rough copper in the United States during March was 96,085 short tons, compared with 75,594 tons in February. The output of refined copper was 88,165 short tons, against 80,275 tons, and stocks of refined copper fell from 83,841 tons to 70,682 tons.

Deliveries to domestic consumers rose sharply, from 98,611 short tons in February to 113,972 tons in March, which was a somewhat longer month. There is certainly nothing in these figures to promote price fears, but if it is remembered that imports at the rate of about 30,000 tons per month are entering the United States, it is obvious that the stockpile must play its part if an increase in stocks is to be avoided.

House Organs

Ruston News, Vol. 3, No. 3. Published by Ruston & Hornsby, Limited, of Lincoln.

Fort-eight pages, most of which are illustrated, are necessary to record the diverse activities of this go-ahead firm and its overseas connections. The effort that is made by the magazine to bring about a true *esprit de corps* within the organisation is commendable and, as it can be assumed that this is its main object, then the reviewer warmly congratulates the Editor.

"Edgar Allen News," April, 1949. Published by Edgar Allen & Company, Limited, Imperial Steel Works, Sheffield, 6.

This issue contains an illustrated description of the reorganisation and mechanisation of the fettling shops. An interesting and debatable feature is the segregation of castings, immediately after stripping, into groups against each firm's actual orders.

Bonus Award for Light-castings Workers

The bonus paid to employees in the light-castings industry is to be increased from next month by 5s. for men and 4s. for women, with proportionate increases for juveniles, under a National Arbitration Tribunal award.

The unions concerned had claimed 8s. for all adult workers, and the employers said that the present average earnings (141s. 11d. for a 44.6-hr. week) compared very favourably with the general level in industry.